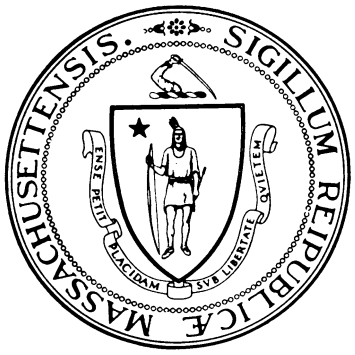
Massachusetts Division of Health Care Finance and Policy

Preventable Hospitalization in Massachusetts

Update for Fiscal Years 1998 and 1999

February 2002

Louis I. Freedman, Commissioner



Jane Swift, Governor
Commonwealth of Massachusetts

Robert P. Gittens, Secretary
Executive Office of Health and Human Services

Executive Summary

Widespread interest among health care professionals in preventable hospitalization (PH) information as a tool for monitoring, assessing and improving the delivery of primary care has prompted the Division of Health Care Finance and Policy (the Division) to publish the fourth in a series of reports on PHs in the Commonwealth. *Preventable Hospitalization in Massachusetts: Update for Fiscal Years 1998 and 1999* presents analyses of PH data from FY98 and FY99 and updates previously published trend analyses. In addition, this report looks at the first two years of observation stay data collected by the Division for FY98 and FY99, and readmissions for ambulatory care sensitive (ACS) conditions in FY98 and FY99.

Preventable and Total Hospitalization Rates Continue to Decline

PH rates declined 18% for all ages from FY92 and FY93 to FY98 and FY99, five percentage points better than the decline in total hospitalizations of just under 13%. After adjusting for a change in hospital coding practice,[2] however, PHs declined by only 9%, four percentage points worse than the decline in total hospitalizations. If observation stays are added to total hospitalizations, the trend in PHs increases by 7%, three percentage points worse than the increase of 4% in total hospitalizations over the six year period (see Figure 1 on page 7). The PH trend for all ages is disproportionately affected by the elderly who, in Fiscal Years 1998 and 1999, were responsible for 62% of all PHs.

A different trend emerges for those ages 0-64. PHs improved (decreased relative to total hospitalizations) from FY92 and FY93 to FY98 and FY99 for those ages 0-64 (see Figure 2 on page 8). After adjusting for the change in hospital coding practices, PHs for the non-elderly declined 24% from FY92 and FY93 to FY98 and FY99 compared to only 19% for total hospitalizations. After adding observation stays, PHs for the non-elderly declined 8% while total hospitalizations remained virtually unchanged.

Observation Stays

An observation stay is a hospital visit for which a patient does not meet criteria for an inpatient admission. In Fiscal Years 1998 and 1999 there was an average of 140,821 observation stays overall and 20,918 observation stays for ACS conditions. Prior to 1993, many of these observation stay patients probably would have been admitted as inpatients and reported as PHs. When looking at the PH trend from FY92 to FY99, therefore, one must consider the advent and growth of observation stays and particularly observation stays for ACS conditions.

Trends by Condition and Age Group

Excluding observation stays, the most notable changes in the rate of PHs per 1,000 people of all ages occurred in asthma (40% decrease), bacterial pneumonia (12%

increase), and chronic obstructive pulmonary disorder (26% increase). The most significant decreases by age group for PHs occurred for those ages 0-17 and for those ages 18-64, 41% and 27% respectively.

Preventable observation stays, measured as a percentage of PHs, decreased with age. Preventable observation stays among children amounted to 66% of PHs for those ages 0-17 in Fiscal Years 1998 and 1999. For those ages 18 to 64 and the elderly, observation stays were 27% and 9% of the respective PHs. A dramatic increase in observation stays may be partially responsible for the disproportionate decline in PHs for those under age 65.

Readmissions

Disease readmissions represent those who have been hospitalized at least two times within the same fiscal year for the same primary diagnosis. In FY98 and FY99, 14.7% of PHs were disease readmissions. Patients readmitted with an ACS condition are a group for whom well-targeted prevention programs could reduce unnecessary suffering and save valuable health care resources.

Congestive heart failure (CHF) for those ages 65 and older was responsible for the highest readmission rate (35%) with over two times as many readmissions as the ACS condition with the second highest readmission rate, chronic obstructive pulmonary disorder (COPD).

PH Rates in the US versus Massachusetts

Rates and trends for three of the most prevalent ACS conditions (asthma, bacterial pneumonia and CHF) in the US were recently published in *Health Affairs*.[2] In 1998, the preventable hospitalization rates for asthma, bacteria pneumonia and CHF were lower in Massachusetts than in the US overall for the non-elderly. The trends (rates of change) from FY90 to FY98 for these three conditions were also lower in Massachusetts than in the US. For the elderly, the rates and trends for bacterial pneumonia and CHF in Massachusetts also were lower than in the United States.

The dramatic increase in observation stays in Massachusetts between 1993 and 1998 may explain part, but certainly not all, of Massachusetts' downward trend for some non-elderly PHs, both in absolute terms and relative to the nation. A number of questions remain, however, including how observations stays are used elsewhere in the United States.

End Notes for the Executive Summary

1. Angina's share of total preventable hospitalizations fell from 12% in Fiscal Years 1992 and 1993 to 3% in Fiscal Years 1998 and 1999. This decrease results primarily from a change in coding practice. In FY94 many hospitals began coding angina as a secondary diagnosis under a primary diagnosis of coronary artery disease (CAD). A closer study of the data showed that the drop in discharges with a primary diagnosis of angina after FY94 was offset by a rise in the number of discharges with a primary diagnosis of CAD.

2. Kozak LJ, Hall MJ, Owings MF. "Trends in Avoidable Hospitalizations, 1980-1998." *Health Affairs*, Vol. 20, No. 2, 225-232, March/April 2001.

Foreword

The Division of Health Care Finance and Policy collects, analyzes and disseminates information with the goal of improving the quality, efficiency and effectiveness of the health care delivery system in Massachusetts. In addition, the Division administers the Uncompensated Care Pool, a fund that reimburses Massachusetts acute care hospitals and community health centers for services provided to uninsured and underinsured people.

Satisfying the Need for Health Care Information

The effectiveness of the health care system depends in part upon the availability of information. In order for this system to function properly, purchasers must have accurate and useful information about quality, pricing, supply and available alternatives. Providers need information on the productivity and efficiency of their business operations to develop strategies to improve the effectiveness of the services they deliver. State policy makers need to be advised of the present health care environment, as they consider where policy investigation or action may be appropriate.

As part of its health care information program, the Division publishes reports that focus on various health care policy and market issues.

Mission

To improve the delivery and financing of health care by providing information, developing policies, and promoting efficiencies that benefit the people of Massachusetts. Agency goals:

- Assure the availability of relevant health care delivery system data to meet the needs of health care purchasers, providers, consumers and policy makers;
- Advise and inform decision makers in the development of effective health care policies;
- Develop health care pricing strategies that support the cost effective procurement of high quality services for public beneficiaries; and
- Improve access to health care for low-income uninsured and underinsured residents.

Table of Contents

Figures

Tables

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Preventable Hospitalization in Massachusetts: Update for FY98 and FY99

Introduction

Preventable Hospitalization in Massachusetts: Update for Fiscal Years 1998 and 1999 is the fourth report by the Massachusetts Division of Health Care Finance and Policy (DHCFP) on preventable hospitalization (PH) in Massachusetts.

Previous DHCFP Reports on PH

The initial publication, *Preventable Hospitalization in Massachusetts*, reviewed PH data for Fiscal Years 1989 and 1990 and offered practical suggestions for applying the information. The second report, *Improving Primary Care: using Preventable Hospitalization as an Approach*, examined the trends for Fiscal Years 1992 and 1993 and described community initiatives that were implemented to reduce the rate of PHs. The third report, *Preventable Hospitalization in Massachusetts: Update for Fiscal Years 1995 and 1996* reviewed the new data and examined PH trends by type of condition, age, payer, insurance plan, and area. That publication also reported on the differences in PH rates between nursing facility and community residents.

PH Report Methodology

Consistent with previous reports, most of the information in this report is an average of two years of data (FY98 and FY99) to increase statistical reliability.

PH trends examined in previous editions is updated and, for the first time, readmission data for all age groups by condition is included. In addition, this update expands on the growing importance of observation stays in patient care and provides a snapshot of observation stay data for Fiscal Years 1998 and 1999 by type of condition, age group, and payer.

Charge Data Not Included

This report differs from previous Division reports on PH in that charge data are not included. While charge data were collected as part of patient-level information, in recent years it has become more difficult to make conclusions about costs or revenues by examining charges. Cost-to-charge ratios vary substantially between institutions and the relationship between charges and revenue likely vary as much as the cost-to-charge ratios. In addition, payers negotiate prices that may have no relationship to hospital charges. As a result, the information provided by these charges is not a useful proxy for the costs of care provided or revenues received.

What are PHs?

Preventable hospitalizations are defined as the inpatient treatment of ambulatory care sensitive (ACS) conditions for which timely and effective use of primary care should reduce the risk of hospitalization.[1] The ACS conditions examined in this report are based on a group of diagnoses initially compiled by John Billings and his colleagues,[2,3] at the United Hospital Fund of New York. A list of the 24 ACS conditions used in this report is presented in Table 9 of

the Appendix. This report also includes several additional disease categories that subsequently were identified by the US Health Resources and Services Administration[4] and Joel Weissman and his colleagues[5] as being responsive to preventive services.

Preventable hospitalization analysis is intended to help communities target opportunities for improving health care. In addition, as Massachusetts broadens the eligibility requirements of public health insurance for children and low-income people, preventable hospitalizations attributable to free care should decline. This report can help measure the effectiveness of public programs in reducing hospitalizations.

End Notes for the Introduction

1. A complete discussion of "preventable hospitalizations" as a tool for analyzing, monitoring, evaluating and improving the delivery of health care services is provided in the first report.

2. Billings, J., et al. Analysis of variation in hospital admission rates associated with area income in New York City. March 4, 1992 (Unpublished manuscript available from United Hospital fund of New York City)

3. Billings, J. Consideration of the use of small area analysis as a tool to evaluate barriers to access. Health Resources and Services Administration. Consensus Conference on Small Area Analysis, DHHD Pub. No. HRS-A-PE-91-1[A]. Washington: DHHS, 1990.

4. United States Department of Health and Human Services. National Heart, Lung and Blood Institute. National Institutes of Health, Bethesda, Maryland. International Consensus Report on Diagnosis and Treatment of Asthma. Publication No. 92-3091. June 1992.

5. Weissman, J.S., Gatsonis, C., and Epstein, A.M. Rates of avoidable hospitalization by insurance status in Massachusetts and Maryland. JAMA 1992;268:2388-2394

Data Sources and Caveats

Most of the data in this report are from the hospital discharge files and are reported by fiscal year for the Commonwealth of Massachusetts (July 1-June 30). All acute care hospitals in Massachusetts are required to submit this information to the state Division of Health Care Finance and Policy (DHCFP) on a quarterly basis. The discharge files contain patient level information on admission and discharge status, demographic characteristics, diagnoses, length of stay, procedures, charges, source of payment and ZIP Code of residence. Inpatient data for Massachusetts residents hospitalized in the states contiguous to Massachusetts and discharges from all facilities operated by the Department of Veterans Affairs in Massachusetts also were added to the discharge files.[2]

Caveats

With the exception of age, this preventable hospitalization (PH) analysis does not control for factors that have a potentially confounding effect on the rate of hospitalizations such as race, socioeconomic status, and gender. As a result, comparisons made between various populations in this report are intended to provide an indication of the characteristics of each group and should not be interpreted as representing conclusive evidence of differences. This report presents the extent and description of PHs among Massachusetts residents, how they may be changing over time, and where possible, reasons for changes. In order to provide the most accurate picture, this report introduces two new sections, "Observation Stays" and "PH Readmissions," for Fiscal Years 1998 and 1999.

Angina

In 1994, hospitals changed their diagnostic coding practices. Patients who were coded as having angina, an ambulatory care sensitive (ACS) condition, prior to 1994 were thereafter coded as having coronary artery disease which is not considered an ACS condition. That change in coding resulted in fewer recorded PHs. The information in the "Highlights and Discussion" section of this report, except where noted, adjusts for the change in coding practice in order to make the trend analyses more meaningful. The adjustment assumes that most of the decrease in angina cases is attributable to the change in coding practices.

To examine this assumption, the trend in cardiac diagnoses was reviewed from FY94 forward and showed an increase in cases that correlated with the decrease in angina cases. Therefore, the number of actual angina cases in FY98 and FY99 was revised by replacing the number of actual cases with numbers that reflected the average decrease of PHs (without angina) from FY92 and FY93 to FY98 and FY99.

Observation Stays

Outpatient observation data are from the new DHCFP Outpatient Observation

Database. This database consists of reports filed by Massachusetts acute care hospitals to DHCFP for FY98 and FY99. The observation stay files contain encounter level information on admission and discharge status, demographic characteristics, diagnosis, length of stay, procedures, charges, source of payment, source of referral and ZIP Code of residence. Patients admitted to a hospital from observation stay status are removed from the observation stay file and are reported as inpatient stays.

Age Groupings

Another feature of this report relates to grouping PHs by age. Earlier publications reported primarily on patients ages zero to 64 as one group. Since some ACS conditions have a very high incidence among children, namely asthma and bacterial pneumonia, this report presents data for all ages and also looks at PHs by more specific age groups: 0-17, 18-64, 0-64 and 65 and over.

With the expansion of MassHealth in 1997, Medicaid now covers most children (ages 0-18) who were previously uninsured or covered under the Children's Medical Security Plan. This expanded coverage includes the provision of MassHealth Standard to children of families that earn up to 150-200% of the federal poverty level (FPL). In addition, MassHealth Basic was developed for adults with income up to 133% of the FPL who have been unemployed for more than a year or earned too little to qualify for unemployment benefits.

In addition, since most seniors have insurance through Medicare, poor access to primary care should be less of a barrier among the elderly than among the non-elderly. This is particularly true for individuals residing in long-term care facilities. However, seniors often suffer from co-morbidities which may exacerbate ACS conditions they may have leading to an increased number of PHs. Preventable hospitalization analysis in both of these age groups is intended to reveal areas in which targeted interventions may reduce costs and improve health status. PH admission data disaggregated by condition, age, and payer are presented in Tables 1-7 in the Appendix.

Small Areas

This report uses a new methodology for grouping ZIP Codes for the small area analysis. The Massachusetts population has changed over the last ten years which required changing the ZIP Code groupings that were used in the first three preventable hospitalization reports. For this report, more recent population estimates (Claritis, 1999) are used and the criteria for grouping ZIP Codes has been modified. The criteria are described in the order in which they were applied.

Minimum Number of People:
At Least 5,000

Some ZIP Codes have very small populations. For the first report, an analysis was performed based upon the incidence of the ACS conditions to determine the smallest population size required to detect a five percent difference from the state rate to generate rate calculations that are meaningful. The same analysis in FY00 produced a minimum number of people within a small area that was just under 5,000. Therefore, that criteria was left unchanged from previous PH reports.

Same County:
No Small Areas Cross County Lines

This is unchanged from the methodology used in previous PH reports.

Same Town:
Towns with Multiple ZIP Codes Remained Grouped Together

If the ZIP Code for Arlington Heights had a median household income closer

to neighboring Lexington than Arlington, for example, Arlington Heights would be grouped with Arlington. This was not a criterion for the small areas defined in previous PH reports.

Contiguous Areas:
With One Exception, ZIP Codes within a Small Area Share a Border

Nahant, the lone exception, was grouped with Swampscott because its median household income was much closer to that of Swampscott than Lynn which has the only ZIP Code that borders Nahant. In previous preventable hospitalization reports, small areas included ZIP Codes that were not contiguous.

Household Income:
Combined ZIP Codes Share Similar Median Household Income

Small area ZIP Codes were grouped together based on similar median household income. The previous methodology grouped ZIP Codes with similar race and income distribution. ZIP Codes were considered to have similar race and income characteristics if the difference in the percentage of minority or the difference in percentage of low income households was less than 15%.[2]

Other

If additional criteria were required, the previous small area grouping was used, if possible.

Annualized Rates

The preventable hospitalization rates presented in the small area analysis are from two years of data that have been averaged to calculate a yearly or "annualized rate" of PHs per 1,000 population. PH rates for the small area analysis were adjusted for differences in age distribution between small areas. In order to smooth out year-to-year fluctuations and increase the statistical reliability of the rates, two years of hospital discharge data were used.

Trend Data

Trends in PH rates were calculated for the following two-year periods: Fiscal Years 1992 and 1993 and Fiscal Years 1998 and 1999. Data on PHs for Fiscal Years 1989 and 1990 are found in the first report, *Preventable Hospitalization in Massachusetts*, January 1994. The numerator used to calculate PH rates includes multiple admissions for the same individual.

Readmissions for ACS Conditions

In 1997, preventable hospitalization data was used to obtain information on patient readmission. A patient flag identified those patients admitted to a hospital more than once during the year for all ACS diagnoses, a disease flag identified patients admitted to a hospital more than once for the same ACS condition.

End Notes for Data Sources and Caveats

1. The fiscal year for hospitals runs from October 1 through September 30. Fiscal Year 1998 is from October 1, 1997 through September 30, 1998.

2. These additional records were obtained from the Massachusetts Health Data Consortium.

3. ZIP Codes were considered to have similar race and income characteristics if the difference in percentage of minority or difference in percentage of low-income households was less than 15 percent. Some ZIP codes did not meet these criteria and were combined with the adjacent ZIP code with the smallest population size.

Highlights and Discussion

The main purpose of this section is to highlight the salient features of the tables presented in the Appendix and to provide a context for interpreting the findings. Various tabulations of the data are reported. PH trends are described in various ways in this report depending upon the point being illustrated:

- the aggregate number of PHs in order to see the overall trend;
- as a proportion of total hospitalizations in order to evaluate PHs in the context of hospital use; and
- as a rate per 1,000 people in order to evaluate PHs in the context of changing demographics.

Total Hospitalizations versus Preventable Hospitalizations

Unadjusted PH rates declined 18% from Fiscal Years 1992 and 1993 to Fiscal Years 1998 and 1999 for people of all ages in Massachusetts, five percentage points better

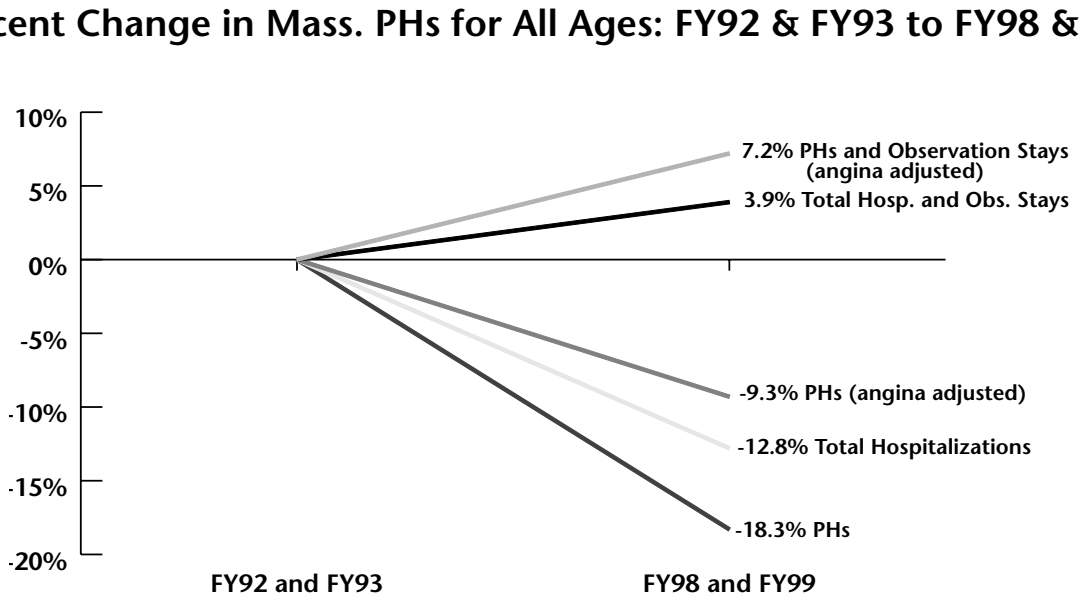


Figure 1

From FY92 and FY93 to FY98 and FY99, PHs did not decline as much as total hospitalizations after adjusting PHs for hospitals' change in coding practice in 1994 that resulted in some PHs no longer being recorded as PHs. When PHs and other observation stays were added to all hospitalizations, PHs still did not improve compared to total hospitalizations. Source: DHCFP

than the decline in total hospitalization of just under 13% (see Figure 1 on page 7). After adjusting PHs for a change in hospital coding practice,[1] however, PHs declined by only 9%, four percentage points worse than the decline in total hospitalizations. If FY98 and FY99 observation stays are added (which were virtually non-existent for most payers prior to 1993) to all hospitalizations, the trend in PHs increases by 7%, three percentage points worse than total hospitalizations' increase of 4%, over the six year period.

The PH trend for all ages is disproportionately affected by the elderly who, in FY98 and FY99, were responsible for 62% of all PHs. A different trend emerges for the 0-64 age group.

Ages 0–64

PHs improved (decreased relative to total hospitalizations) between FY92 and FY99 for those ages 0-64 (see Figure 2 below). When adjusted for the change in coding practices of hospitals, PHs for the non-elderly decline 24% from FY92 and FY93 to FY98 and FY99 compared to only 19% for total hospitalizations. If observation stays are added, PHs for the non-elderly decline 8% while total hospitalizations remain virtually unchanged.

From FY92 and FY93 to FY98 and FY99, preventable hospitalizations as a percentage of total hospitalizations fell in the pediatric population (from 10.7% to 8.0%), remained the same for the 18-64 age group (approximately 11.4%), and rose slightly in the elderly population (from 26.1% to 27.2%) (see Figure 3 on page 9). Figure 3 illustrates that hospitalizations among the elderly population are more likely to be for ACS conditions than for either the 0-17 or the 18-64 age groups.

Percent Change in PHs for Ages 0-64: FY92 and FY93 to FY98 and FY99

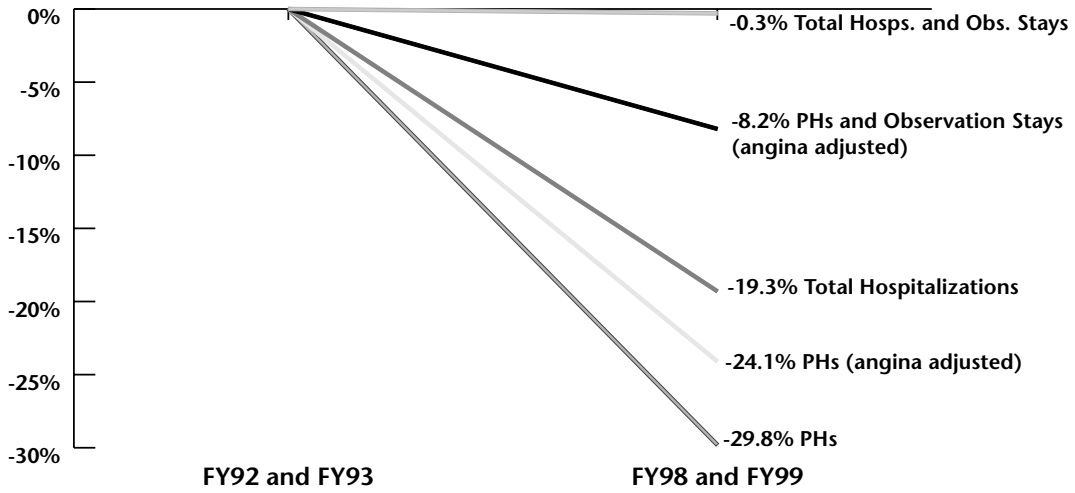


Figure 2

From FY92 and FY93 to FY98 and FY99, PHs for those ages 0 to 64 declined more than total hospitalizations, even after adjusting for hospitals' change in coding practice in 1994 that resulted in some PHs no longer being recorded as PHs. When PHs and other observation stays were added to all hospitalizations, PHs remain improved compared to total hospitalizations. Source: DHCFP

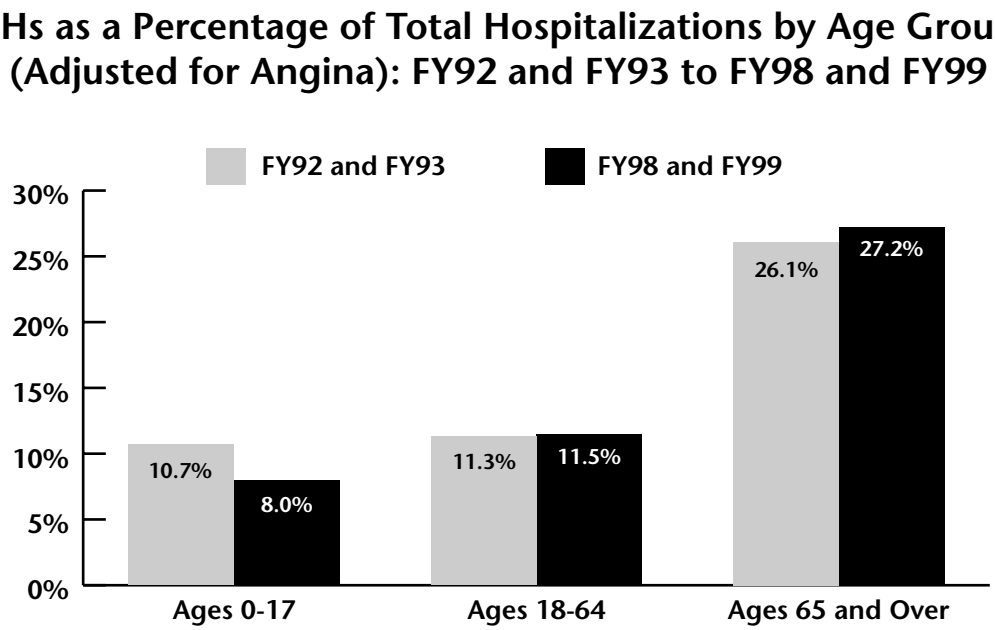


Figure 3

The elderly are far more likely to be hospitalized for an ACS condition than other populations. From FY92 and FY93 to FY98 and FY99, elderly PHs as a percent of total hospitalizations increased slightly in contrast with those ages 0-17 whose PHs as a percent of total hospitalizations decreased 25%. Source: DHCFP

Comparing Massachusetts and US Preventable Hospitalization Rates

Comparing Massachusetts PH rates with the US PH rates published in *Health Affairs* in 2001,[2] revealed similarities and differences in the definitions of PHs. Rates and trends for three of the most prevalent ACS conditions (asthma, bacterial pneumonia and CHF) were common to both studies. Massachusetts data from FY90 and FY98 was used to match the calendar years reported in the US study. A small amount of variation between US and Massachusetts rates may be attributable to the fact that US rates are reported by calendar year and Massachusetts rates are reported by fiscal year.

Ages 0-64

In 1998, the PH rates for asthma, bacteria pneumonia and CHF were lower in Massachusetts than in the US for the non-elderly. The trends (rate of change), from 1990 to 1998, for these three conditions were also lower in Massachusetts than in the US.

Ages 65+

Since asthma related PHs are a relatively small proportion of elderly PHs, the asthma trend for the elderly is not included in this report. Similar to the PH rates for non-elderly, in FY98, the rates for bacterial pneumonia and CHF were lower in Massachusetts than in the US and the Massachusetts rate of change from FY90 to FY98 were also lower.

For the population under age 65, the increased use of observation stays in Massachusetts may be partly responsible for Massachusetts's apparent good performance, at least for asthma, relative to the US.

Bacterial Pneumonia PHs per 1,000 Population for Ages 0-64 in Massachusetts versus the US: FY90 and FY98

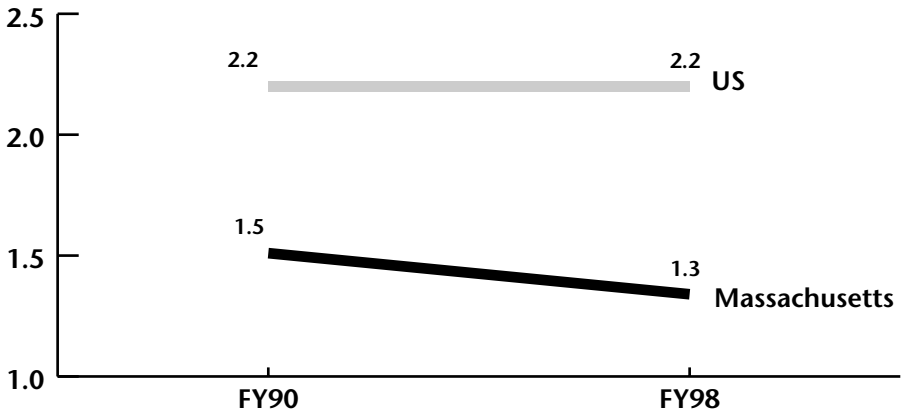


Figure 4

The rate of PHs in FY90 for bacterial pneumonia among those ages 0 to 64 in Massachusetts was 30% lower than for the United States. The US trend remained flat while the Massachusetts trend improved over time. Sources: DHCFP for Massachusetts and *Health Affairs* for US data.

Asthma PHs per 1,000 Population for Ages 0-64 in Massachusetts versus the US: FY90 and FY98

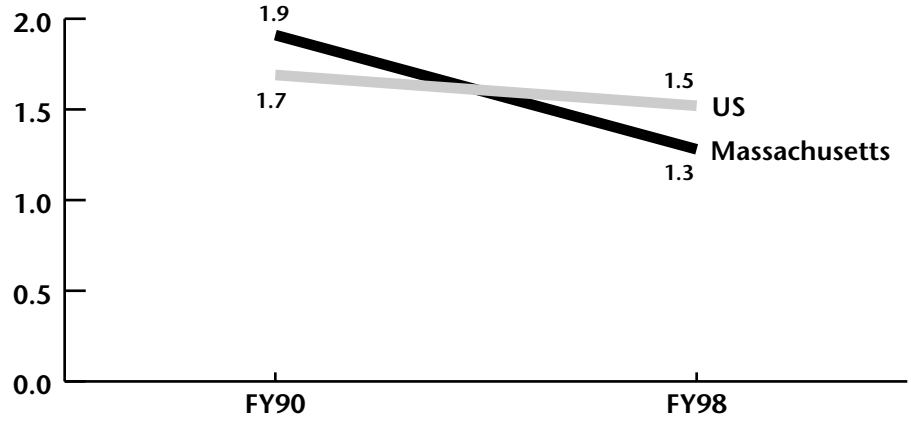


Figure 5

From FY90 to FY98, the trend for asthma PHs among those ages 0 to 64 decreased slightly in the US while the Massachusetts rate decreased 33%. Sources: DHCFP for Massachusetts and *Health Affairs* for US data.

CHF PHs per 1,000 Population for Ages 0-64 in Massachusetts versus the US: FY90 and FY98

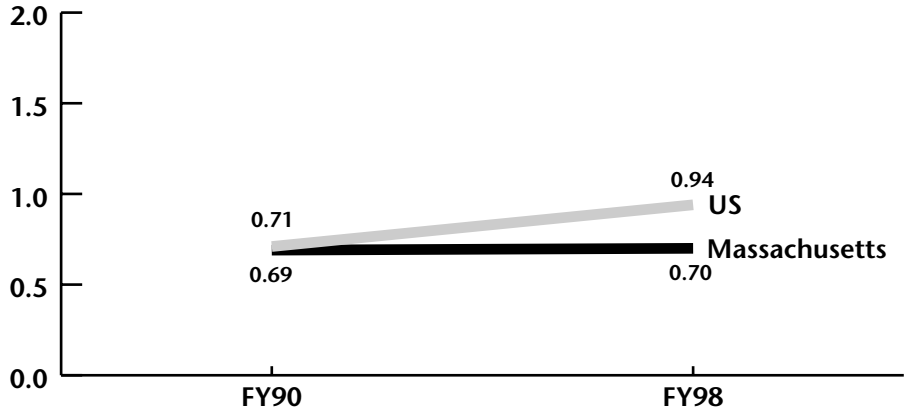


Figure 6

From FY90 to FY98, the trend for CHF PHs among those ages 0 to 64 increased 32% in the US while the Massachusetts rate was virtually unchanged. Sources: DHCFP for Massachusetts and *Health Affairs* for US data.

Bacterial Pneumonia PHs per 1,000 Population for Ages 65 and Over in Massachusetts versus the US: FY90 and FY98

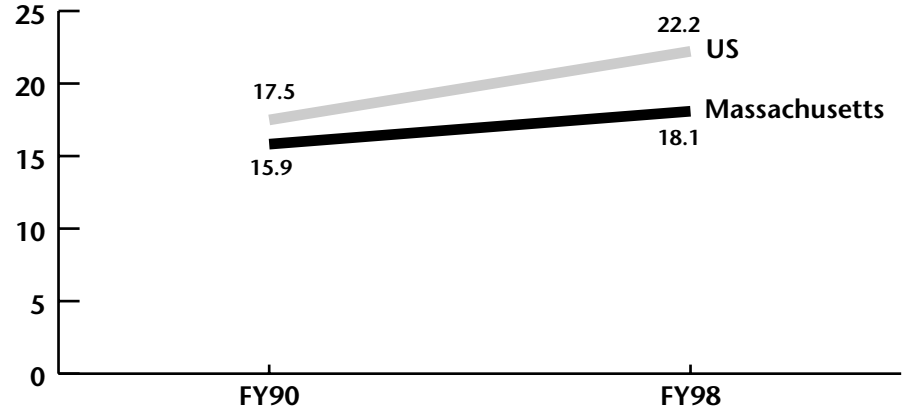


Figure 7

In FY90, PHs for bacterial pneumonia among the elderly were higher in the US than in Massachusetts, and the US trend increased at a higher rate. Sources: DHCFP for Massachusetts and *Health Affairs* for US data.

CHF PHs per 1,000 Population for Ages 65 and Over in Massachusetts versus the US: FY90 and FY98

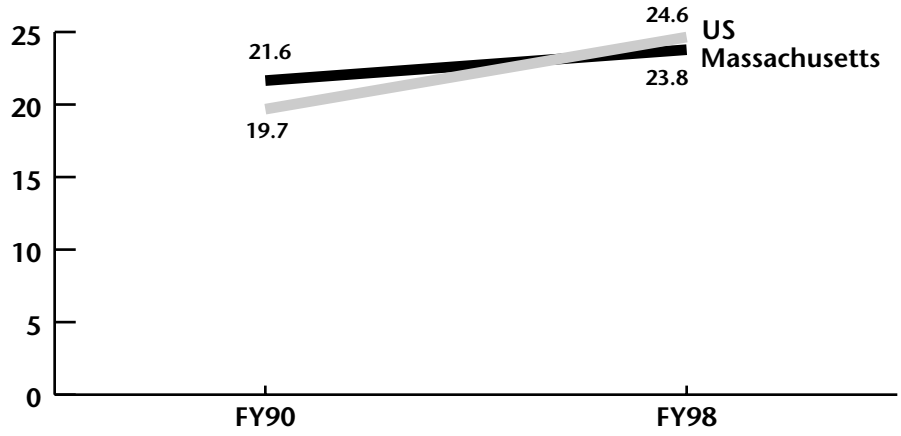


Figure 8

In FY90, the PH rate in Massachusetts was slightly worse than the US PH rate for CHF among the elderly. PH rates for CHF increased slightly more for the US than Massachusetts over time. As a result, the US PH rate for CHF was slightly higher than the Massachusetts rate in FY98. Sources: DHCFP for Massachusetts and *Health Affairs* for US data.

A number of questions remain, however, among which is how observations stays are used elsewhere in the US.

Length of Stay

A common measure of hospital resource use is length of stay. The average length of stay (ALOS) for both preventable and total hospitalizations decreased for the non-elderly population from FY92 to FY98. In FY99, the steady downward trend in ALOS for total hospitalizations reversed, increasing by 13.9% (from 4.3 to 4.9 days), to an ALOS that is longer than it was in FY92 (4.7 days).

The declining ALOS for preventable hospitalizations reversed in FY98 but then increased only 5% over the next two years from 3.9 to 4.1 days (see Figure 9 on page 13). Among the top ten ACS conditions in the 0-64 age group, diabetes had the largest decrease (33%) in ALOS from FY92 to FY99.

Preventable Hospitalizations by ACS Condition

The trends in PH rates per 1,000 population for all ages, between FY92 and FY99 were most notable for asthma, bacterial pneumonia, and COPD. The rate of asthma PHs for all ages decreased by 40.2%, from a high of 2.26 asthma PHs per 1,000 population in FY92 and FY93 to a rate of 1.35 per 1,000 population in FY98 and FY99. In contrast, bacterial pneumonia PHs for all ages increased by 11.9% and now accounts for 22.0% of all PH admissions. COPD PHs during this same period increased 26.4% from 1.85 per 1,000 population to 2.34 per 1,000 population.

Preventable Hospitalizations by Age Group and ACS Condition

In the 0-17 age group, the preventable hospitalization rate per 1,000 population decreased twice as much (41%) as total hospitalizations (20.5%) from FY92 and FY93 to FY98 and FY99. Asthma remains the most prevalent ACS condition for pediatric PH admissions despite the 52.5% decrease from FY92 and FY93 PH rates. The PH rates per 1,000 children for bacterial pneumonia and dehydration decreased by 27% and 21.7% respectively (see Figures 10, 11 and 12 on pages 14-15).

Ages 18-64 and Ages 0-64

From FY92 and FY93 to FY98 and FY99, six of the ten most prevalent PHs for the 18-64 age group, decreased. COPD was the most notable exception, which increased 25.8%, while the second highest increase was for convulsions at only 6.2%.

Among children and adults up to age 65, preventable hospitalization rates for all of the ten most prevalent ACS conditions decreased from 4% to 39% with the exception of COPD, which increased 23.6%.

Ages 65 and Over

PH rates among the elderly fell 15.1% from FY92 and FY93 to FY98 and FY99. Despite this decrease, the elderly as a group account for a greater percent of PHs, increasing from 56% of all PHs in FY92 and FY93 to 62% of all PHs in FY98 and FY99. This can be explained, at least in part, by the disproportionate decrease in PHs among the non-elderly population and an increased number of elderly in Massachusetts. PH rates that increased among the elderly population from FY92 and FY93 to FY98 and FY99

Average Length of Stay for PHs among those Ages 0-64 in Massachusetts: FY92-FY99

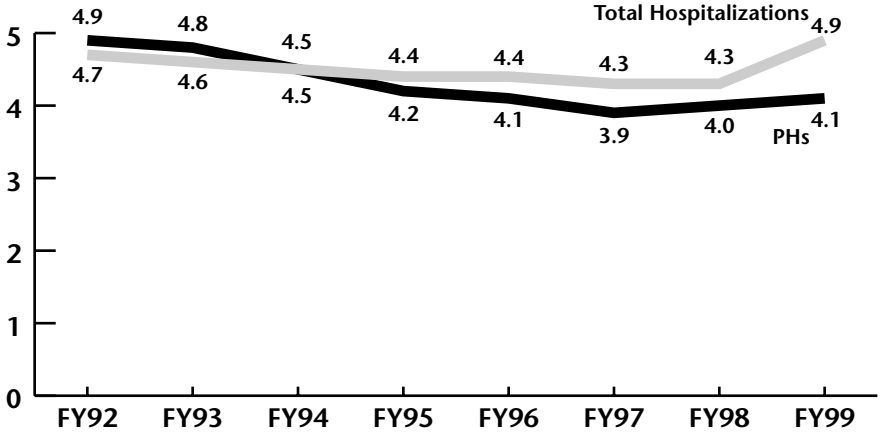


Figure 9

Average length of stay for both PHs and total hospitalizations gradually decreased for the non-elderly population from FY92 and FY93 to FY98 and FY99. The trend for total hospitalizations reversed in 1999, increasing nearly 16% in one year. Source: DHCFP

Asthma PHs and Observation Stays per 1,000 Population by Age in Massachusetts: FY92- FY99

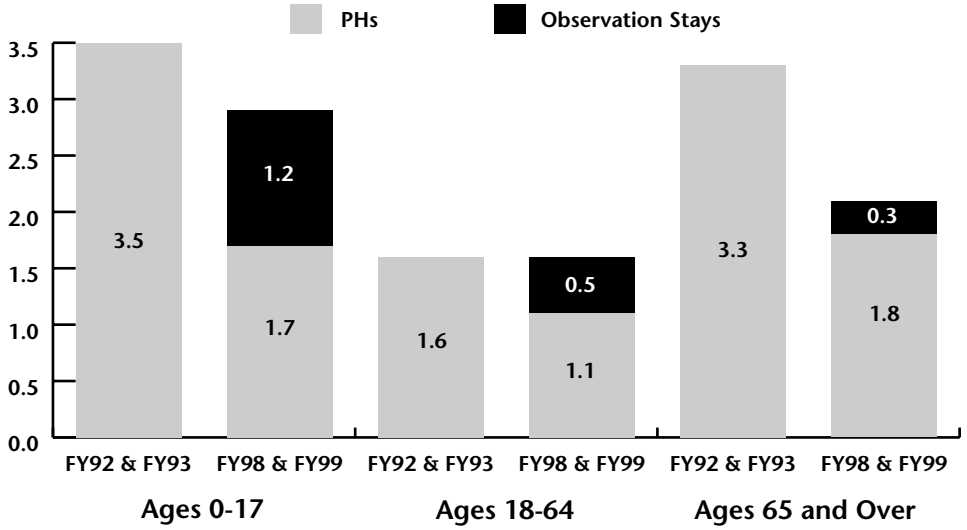


Figure 10

Asthma PHs fell substantially from FY92 and FY93 to FY98 and FY99 for all age groups. Adding observation stays tempered the decline for the pediatric and elderly populations. When observation stays are included, asthma PHs remained unchanged for those ages 18 to 64. Source: DHCFP

Bacterial Pneumonia PHs and Observation Stays per 1,000 Population by Age in Massachusetts: FY92- FY99

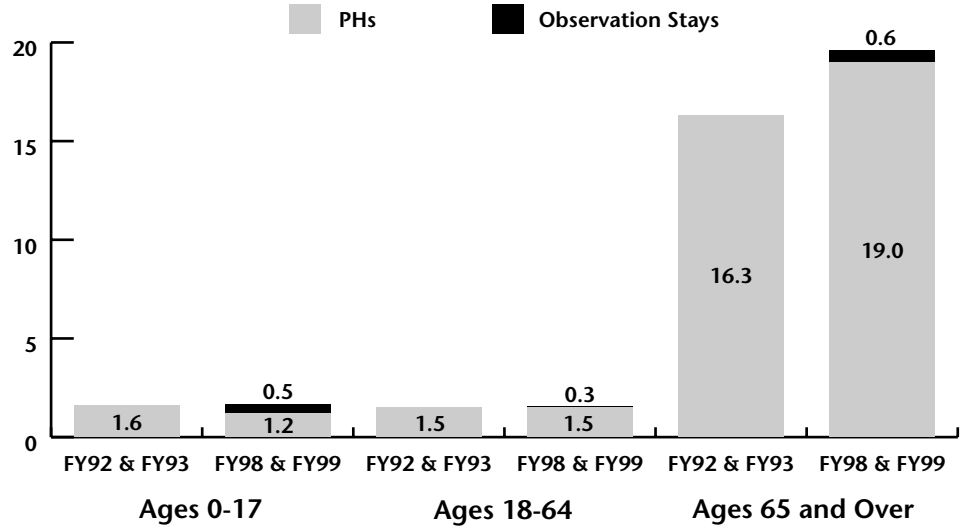


Figure 11

PHs for bacterial pneumonia occur primarily among the elderly. When observation stays are included, bacterial pneumonia PHs increase for each age group. Source: DHCFP

Dehydration PHs and Observation Stays per 1,000 Population by Age in Massachusetts: FY92-FY99

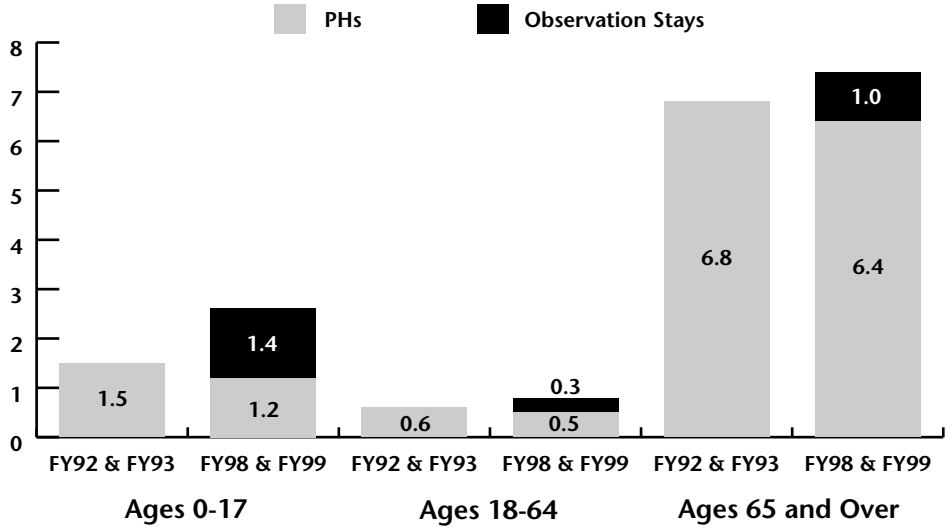


Figure 12

Dehydration PHs per 1,000 population decreased for each age group from FY92 and FY93 to FY98 and FY99. Adding observation stays reversed this trend for each age group, particularly the pediatric population whose 20% decrease in PHs without observation stays increased over 70% when adding observation stays. Source: DHCFP

were COPD (21.7%) and bacterial pneumonia (16.0%) (see Figure 11 on page 14 and Figure 13 on page 16). Health care providers should more closely examine the elderly presenting with these ACS conditions to determine whether targeted interventions could moderate PHs for this population.

Preventable Hospitalizations Among Nursing Home Residents

Preventable hospitalizations among nursing home residents were first reported in the April 1998 report *Preventable Hospitalization in Massachusetts, Update for Fiscal Years 1995 and 1996*. The three primary ACS conditions for which nursing home residents are admitted to hospitals are bacterial pneumonia, CHF, and kidney/urinary infection. In FY98 and FY99, nursing facility resident PHs constituted 30.4% of total hospitalizations for nursing home residents while PHs for elderly residents living within the community accounted for only 25% of their total hospitalizations (see Figure 14 on page 16 and Table 6 in the Appendix).[3]

Despite their obviously frailer state, one might expect that nursing home residents, who have better access to primary care than do elderly living in the community, would have a lower ratio of PHs to total hospitalizations than their non-institutionalized counterparts. The impact of case mix variation between the two populations is mitigated by the fact that the rate is calculated as the number of PHs for each group divided by the number of total hospitalizations for each group. If differences in severity affect the numerator and denominator equally, the overall rate of PHs will remain unchanged. Consequently, the findings are not what one might expect.

COPD PHs and Observation Stays per 1,000 Population by Age in Massachusetts: FY92-FY99

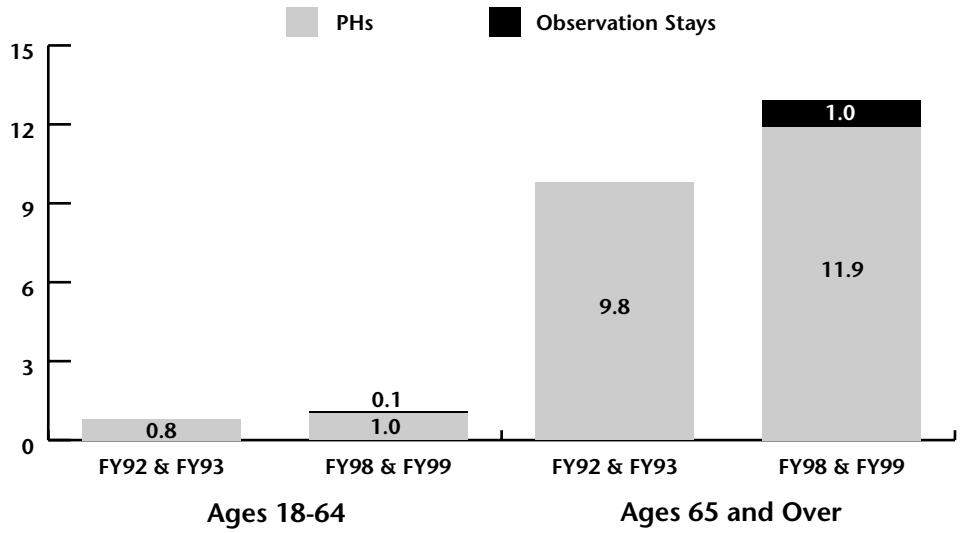


Figure 13

Chronic obstructive pulmonary disease (COPD) is the only one of the top ten ACS conditions for which PHs increased for both the elderly and non-elderly. COPD PHs increased 21.7% for the elderly and 23.6% for the non-elderly, not including observation stays. The next highest rate of "increase" among the non-elderly was for convulsions with a 4% decrease in PHs. Source: DHCFP

Mass. PHs as a Percentage of Total Hospitalizations from Skilled Nursing Facilities versus Community Residences for Ages 65+: FY98 and FY99

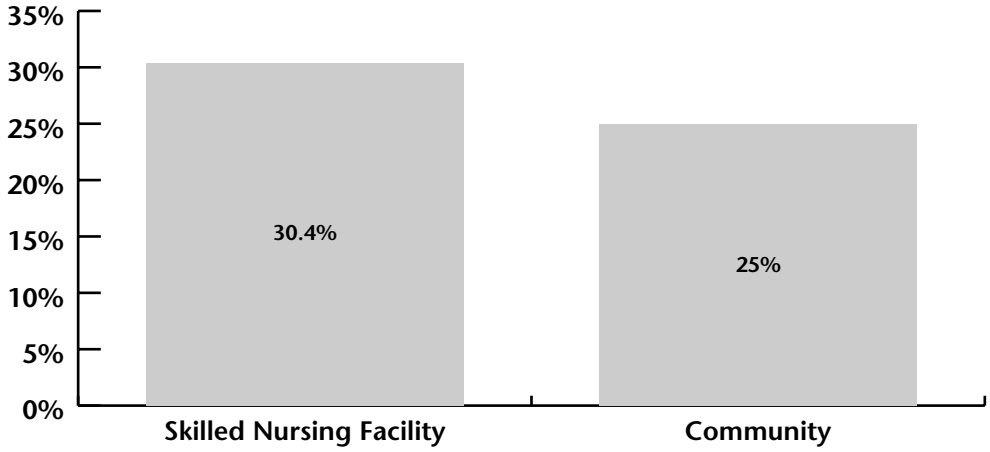


Figure 14

In FY98 and FY99, nursing facility resident PHs constituted 30.4% of total hospitalizations. At the same time, only 25% of total hospitalizations for elderly residents living in the community were "preventable." Source: DHCFP

Although nursing facility residents have greater access to primary care, they also suffer higher rates of co-morbidities and are more likely to be exposed to a greater number of infections than the non-institutionalized elderly. The differences in PH rates may also relate to nursing home policies on resident treatment and hospitalization. However, without controlling for other factors, it is not possible to draw any firm conclusions regarding the reason for this difference.

It is particularly important to reduce the number of PHs in the elderly population. Hospital stays have been found to cause additional complications in up to 60% of elderly patients (hospital-related infections, and the physical and emotional trauma associated with hospital admittance).[4] The Massachusetts Division of Medical Assistance, which pays for approximately 70% of Massachusetts nursing home bills, has an initiative to reduce the incidence of PHs among nursing facility residents. This initiative focuses on reducing hospitalizations attributable to nursing homes' top five PHs: CHF, kidney/urinary tract infection, dehydration, bacterial pneumonia, and COPD.

Note that this report examines the rate of PHs among skilled nursing facility residents using a new methodology to track nursing home admissions for ACS conditions.[3] Therefore, the rates reported here are not comparable to nursing home and community elderly PH rates in the previous report.

Observation Stays

Observation stay patients are monitored and evaluated to determine the need for inpatient admission; patients may receive the identical therapies they would have received had they been admitted, however, the reimbursement rate for observation stays is lower than that for hospital admissions. In most instances, the determination of a visit as observation versus an admission is based on a two-step process.

First, hospital staff determine whether a patient who is presenting for care should be admitted to the hospital. This determines the services for which the hospital bills the payer. Upon review of the claim, the payer judges whether the episode fits the criteria for an observation stay or an inpatient admission. At this point, the payer may argue that an admission should be reclassified as an observation stay.[5] It is unclear to what degree the observation stay data reported by hospitals to the Division of Health Care Finance and Policy (DHCFP), reflects changes insurers make to hospital bills.

Observation stays as a reimbursable service grew out of the Medicare Prospective Payment System in the late 1980s. They were instituted to provide a payment category for those patients who did not meet specific admission criteria or for whom the need for admission could not be determined without further observation. Anecdotal reports from the Massachusetts Hospital Association and correspondence with hospitals and insurers indicate that observation stays were not widely used by payers other than Medicare prior to 1993. The implementation of observation stays as a payment category by HMOs and private payers began in earnest at the end of 1993.

As discussed in *Preventable Hospitalization in Massachusetts: Update for Fiscal Years 1995 and 1996*, DHCFP initiated a plan to collect observation stay data which began in FY98. Based on hospital cost report data, it is estimated that between FY95 and FY97 alone, the number of observation stays in Massachusetts hospitals increased by 86%. As a result, DHCFP formalized a patient-level data collection process in 1998 to collect patient level observation stay data from all Massachusetts acute care hospitals.

The role observation stays play in PH trends is not certain. Some observation stays

in FY98 and FY99 could have been classified as hospital admissions in FY92 and FY93, and others may have been classified as emergency department visits. Although it is likely that the care provided in today's observation stays would have been provided in an inpatient setting rather than an emergency department in FY92 and FY93, the evidence is not conclusive.

If total observations stays are added to total hospitalizations and preventable observation stays are added to PHs, the ratio of PHs to total hospitalizations remains the same. Differences become apparent only when examining observation stays by age or ACS condition.

Observation Stays by Age and ACS Condition

Preventable observation stays (as a percent of PHs) are more frequent among those under age 65. Observation stays, as a percent of PHs for those ages 0-17, 18-64 and the elderly are 66%, 27% and 9% respectively. For all ages, there was an average of 20,918 preventable observation stays per year in FY98 and FY99 or 18.6% of preventable hospitalizations (see Table 1 in the Appendix). The largest number of preventable observation stays in FY98 and FY99 for all ages were for asthma (an average of 3,798 each year), which also had the greatest rate of decline in PHs (except angina, whose drop is attributable primarily to a change in coding practices) from FY92 and FY93 to FY98 and FY99. Asthma was followed closely by dehydration with an average of 3,756 observation stays in FY98 and FY99.

Effect of Observation Stays on Rate of Preventable Hospitalizations

For each of the top 10 ACS conditions, for all ages, adding preventable observation stays to PHs either moderated or intensified, but did not change, the trend in PHs from FY92 and FY93 to FY98 and FY99. For example, when observation stay data are added to PHs for FY98 and FY99, asthma PH rates for all people decreased 12.4% from FY92 and FY93, significantly less than the 40.2% decrease when FY98 and FY99 observation stays are not included (Figure 10 on page 14 displays this information for each of the three age groups). The rate of PHs for COPD increased 26.5% from FY92 and FY93 to FY98 and FY99. After adding COPD observation stays, preventable events increased 37.8% (see Figure 13).

Downward trends in PH rates within some age groups and ACS conditions reversed when observation stays were included. Including preventable observation stays with PHs had the greatest effect on dehydration among the 0-17 age group (see Figure 12). From FY92 and FY93 to FY98 and FY99, the 21.7% decrease in dehydration PHs becomes an increase of 69.7% when observation stays are included.

Payer Composition

Figure 15 on page 19 shows the number of PHs in FY98 and FY99, as a percent of total hospitalizations for each of ten types of payers: managed commercial, non-managed commercial, HMOs, PPOs, POS plans, managed Medicare, non-managed Medicare, managed Medicaid, non-managed Medicaid and the uninsured. Payers that don't fit into one of these categories ("other payers") are not included in the graph but are included in Table 7 of the Appendix. Other payers include payers such as government payers that do not fit into one of the major payer categories. All other payer discharges account for approximately 3% of total PHs.

Each payer's ratio of PHs to total hospitalizations suggests how successful payers are in providing primary care services to avoid preventable hospitalizations. The impact of variation in patient case mix across individual payers is mitigated by the fact that PHs are expressed as a share of each payer's total admissions although other factors, such

PHs as a Percentage of Total Hospitalizations in Massachusetts by Payer for All Ages: FY98 and FY99

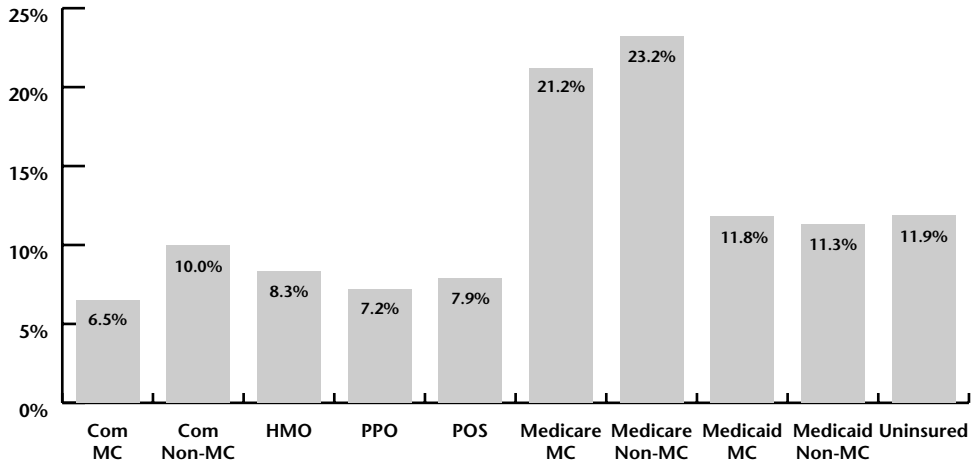


Figure 15

Some managed care health plans see fewer PHs per total hospitalizations than their non-managed counterparts. Commercial managed care payers, however, experience lower proportions of PHs than more tightly managed payers such as HMOs and POS plans. Source: DHCFP

as an uneven distribution of people with chronic diseases among payers, could contribute to differences among payers.

One could expect that managed care plans would reduce the ratio of PHs to total hospitalizations because managed care organizations claim to provide high quality care by improving access to preventive services and by better coordinating care than non-managed care. This appears to be the case when comparing managed commercial and Medicare plans with non-managed commercial and Medicare plans. The proportion of total hospitalizations which are PHs for these managed plans (6.5% and 21.2% respectively) are lower than those of their respective non-managed plans (10.0% and 23.2%). This is not the case when comparing HMOs (8.3%) with PPOs (7.2%) and POS plans (7.9%), of which, the latter two provide less managed care than HMOs. Unfortunately, it is not possible for us to control for other variables that could account for HMOs' higher proportion of PHs such as characteristics of people who choose less tightly managed care plans.

The high rates of PHs in FY98 and FY99 for the uninsured (11.9%), as a percent of total hospitalizations, illustrate that these people are more likely to be hospitalized for an ACS condition than are people with private insurance coverage. Part of this relatively high rate of PHs may be attributable to the lack of access to primary care within the uninsured population. However, Medicaid participants have PH rates (11.8% and 11.3% for managed and non-managed Medicaid respectively) which are nearly as high as the uninsured.

Insurance coverage may be less important in determining rates of PHs than other characteristics that are common to both

the uninsured and the Medicaid population, such as socio-economic characteristics or that access to insurance is not synonymous with access to care. It is also possible that Medicaid covers a disproportionate number of people with ACS conditions.

Preventable Observations Stays

Figure 16 below shows preventable observation stays as a percent of PHs by payer. This indicates the degree to which different payers employ observation stays. To facilitate this comparison, the figure above each observation stay bar is the number of preventable observation stays as a percent of PHs.

One might expect managed care plans to make greater use of observation stays, through their selective contracting with hospitals, than non-managed plans, but this is not consistent for the three payers that reported on both their managed and non-managed care options. Managed Medicare uses over two times more preventable observation stays (as a percent of PHs) than non-managed Medicare (19% compared to 7%). Conversely, managed Medicaid uses fewer preventable observation stays than non-managed Medicaid. Preventable observation stays are nearly the same for managed and non-managed commercial insurers (32.3% and 32.8% respectively). No clear picture emerges to explain the differences between managed and non-managed plans.

Readmissions

To understand the population described by the PH data, it is important to quantify the occurrence of hospital readmissions[6] —i.e.—the frequency with which individ-

Preventable Observation Stays as a Percentage of Total PHs in Massachusetts by Payer for All Ages: FY98 and FY99

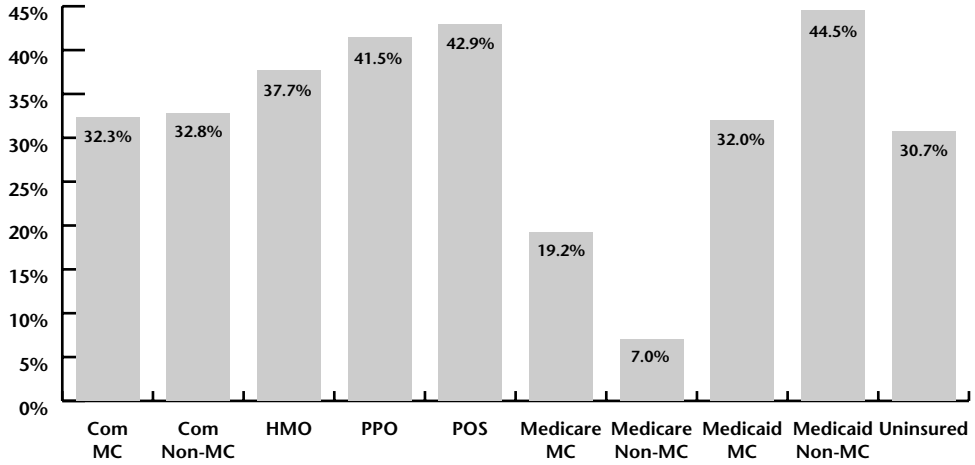


Figure 16

POS plans, PPOs, HMOs and non-managed Medicaid use preventable observation stays most frequently. Medicare, which created observation stays as a payment category, uses the fewest number of preventable observation stays. Source: DHCFP

COPD, CHF, and Bacterial Pneumonia PHs and Readmissions in Massachusetts by Age Group: FY98 and FY99

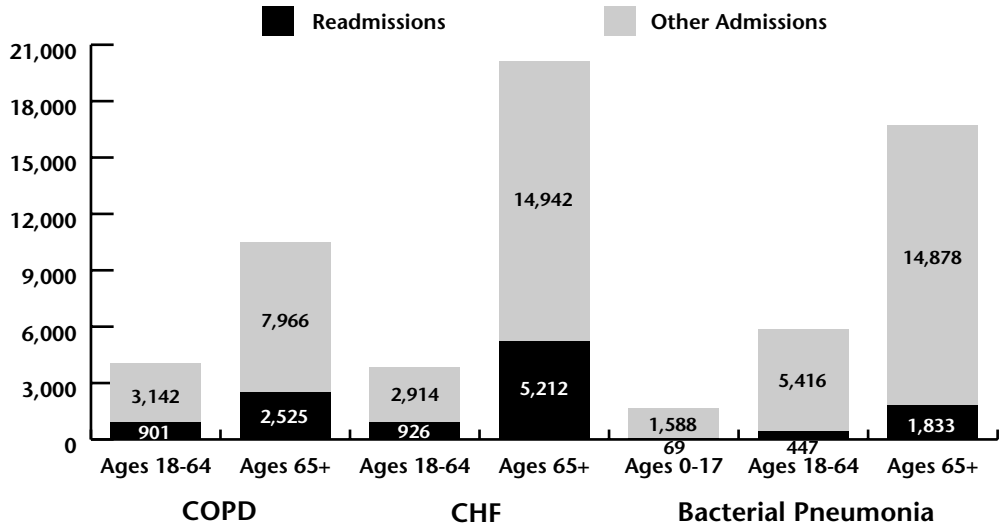


Figure 17

Readmissions occur more frequently among the elderly than other age groups. Congestive heart failure (CHF) PHs among the elderly are responsible for the highest number and percent of readmissions. COPD among the elderly is second in both the number and percent of readmissions, but just half the number of CHF readmissions. Source: DHCFP

ual patients are readmitted to the hospital for the same diagnosis. High readmission rates for ACS conditions are an indication that people are repeatedly having difficulty accessing care or difficulty receiving high quality care. Identifying readmissions in certain geographic areas or hospitals, and for specific conditions or payers can be useful in targeting interventions to patients with the goals of improving patient quality of life, reducing multiple hospitalizations and improving cost effectiveness.

The DHCFP began flagging readmission data for all discharge diagnoses in FY97. A PH readmission includes only those patients readmitted to acute care hospitals with the same diagnosis within the same fiscal year. Readmissions were 14.7% of total PHs in FY98 and FY99.

Figure 17 above shows admissions and readmissions for the top three ACS conditions for which readmissions occur. CHF for people ages 65 and older was responsible for the highest number of readmissions (35%) and for over two times as many readmissions as the ACS condition with the second highest number of readmissions, COPD. Although COPD for the elderly was responsible for fewer readmissions than CHF, COPD had a 32% readmission rate.

Small Area Analysis

Table 8 in the Appendix shows the average annualized rates of PHs for each of the 357 small areas in Massachusetts for FY98 and FY99.[7] The PH rates (per one thousand population) for all ages are age adjusted to account for the variation in the number of elderly who have a disproportionate number of PHs. Figures 18-33 on the following pages

Preventable Hospitalizations in Massachusetts FY98 and FY99, All Ages

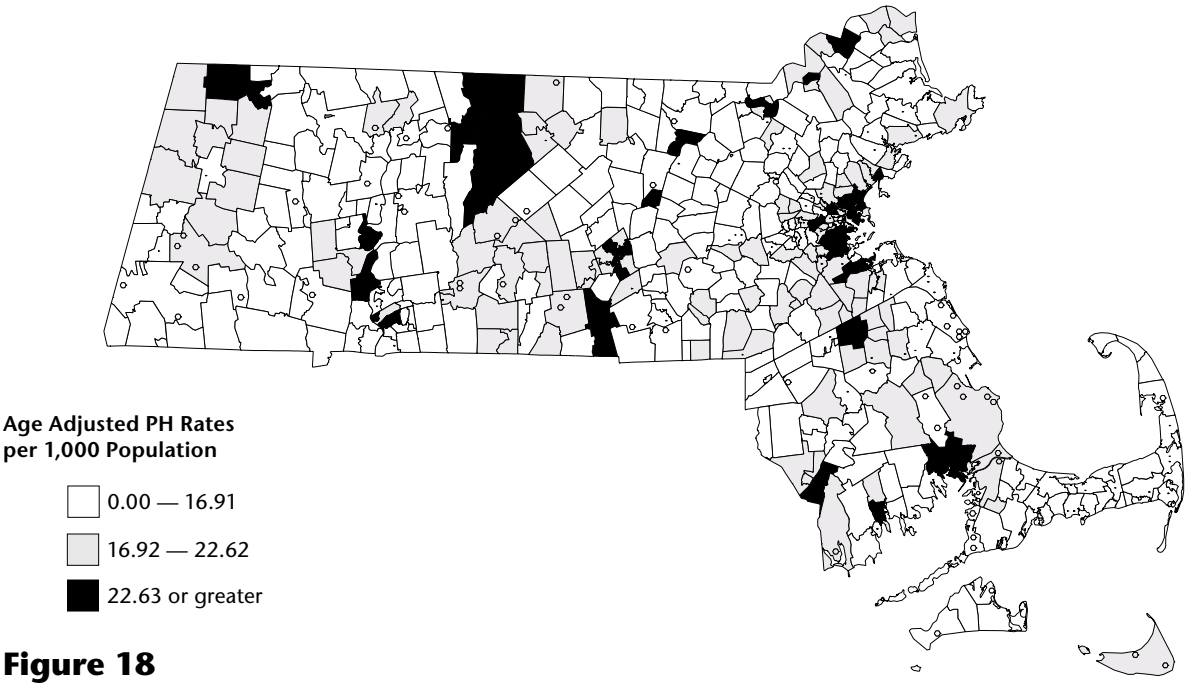


Figure 18

Preventable Hospitalizations in Massachusetts FY98 and FY99, Ages 0-17

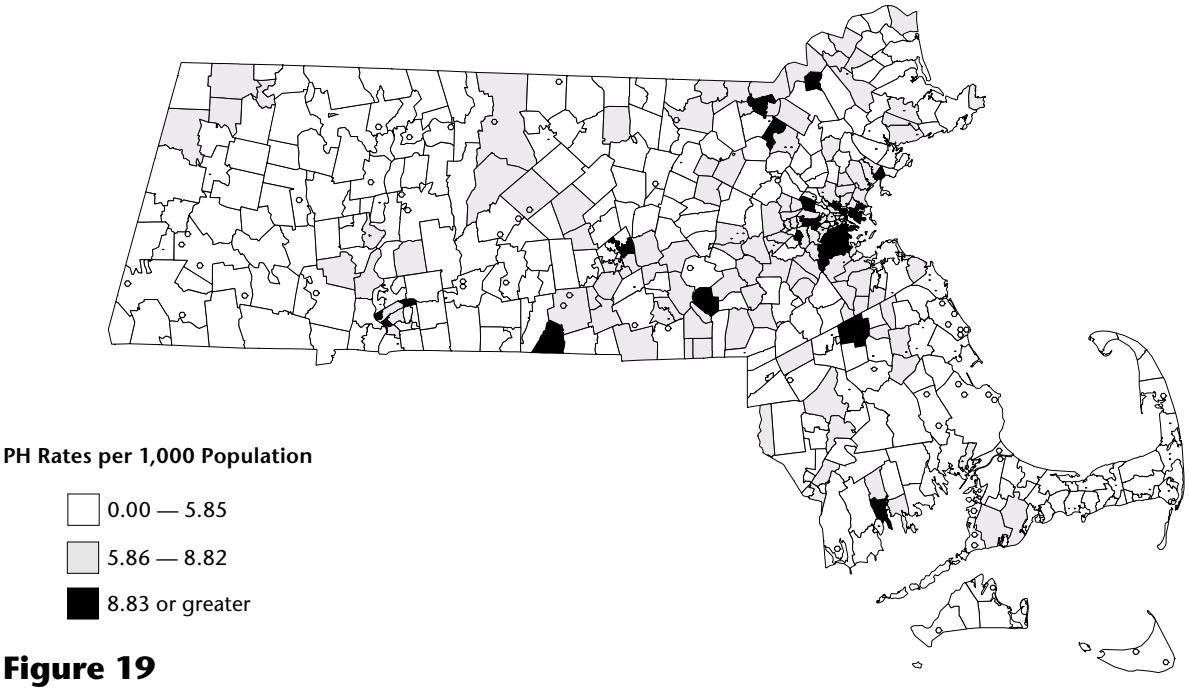


Figure 19

Preventable Hospitalizations in Massachusetts FY98 and FY99, Ages 18-64

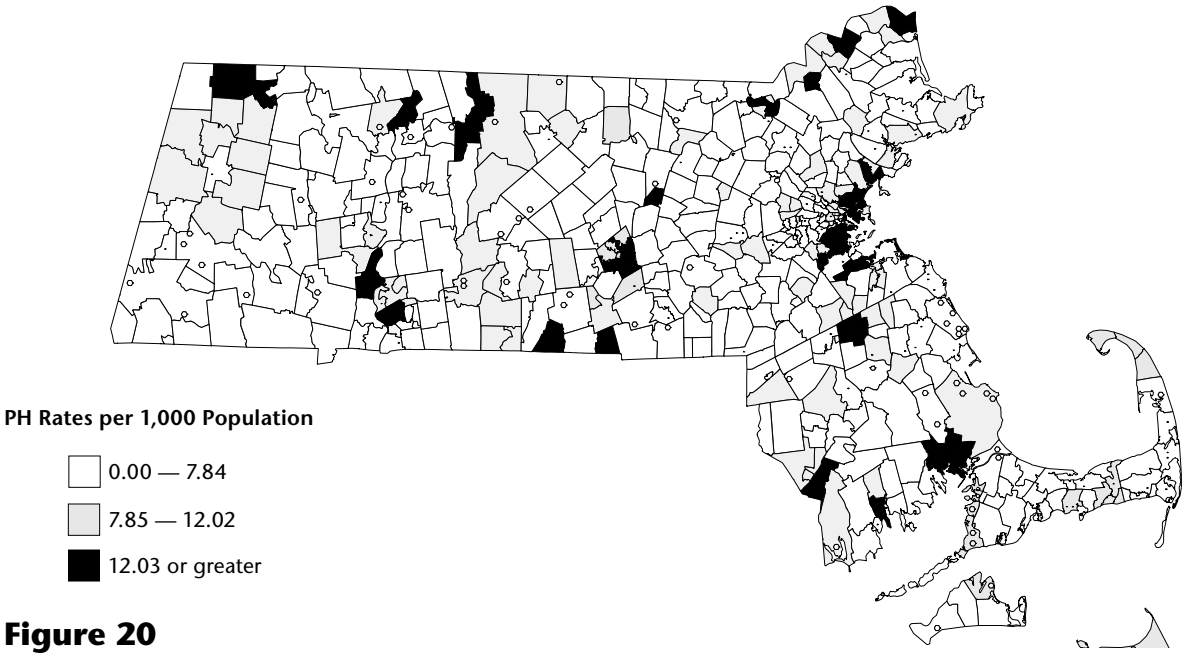


Figure 20

Preventable Hospitalizations in Massachusetts FY98 and FY99, Ages 65 and Over

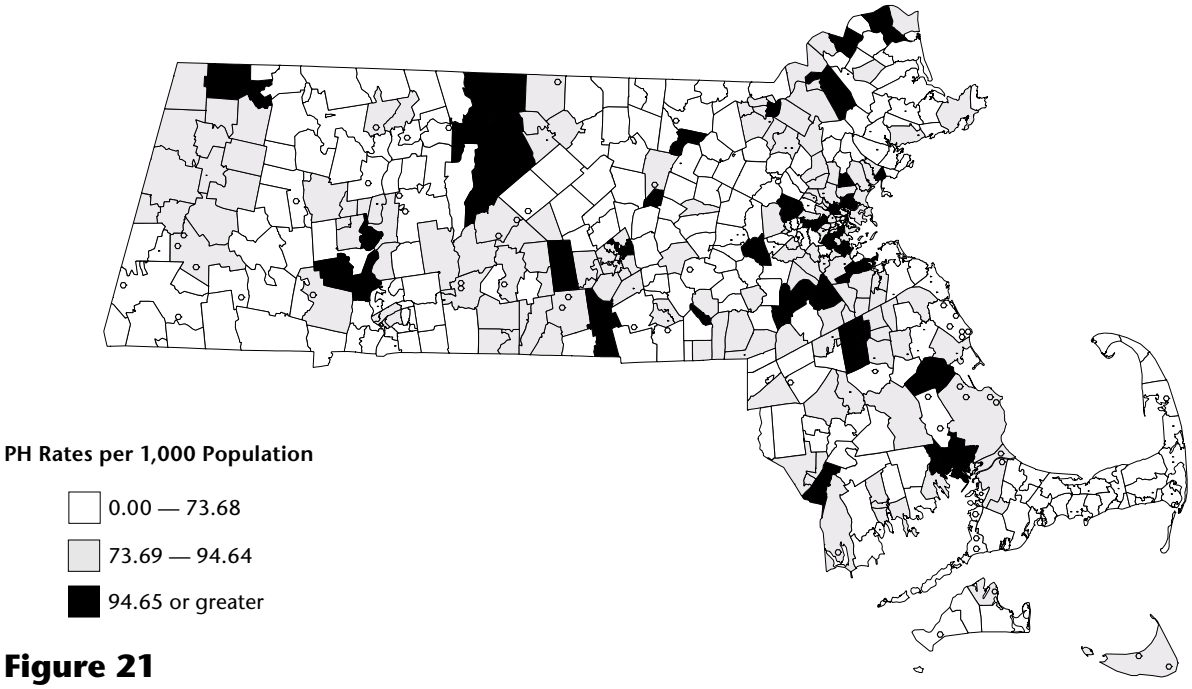
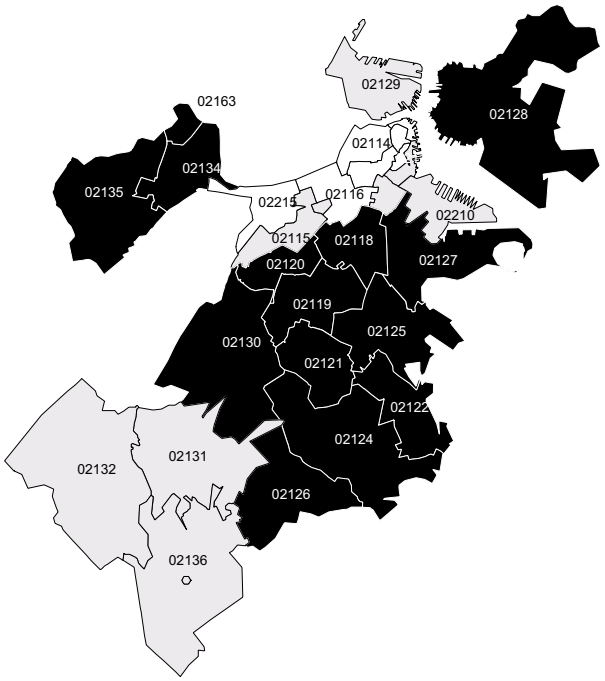


Figure 21

Preventable Hospitalizations in Boston FY98 and FY99, All Ages

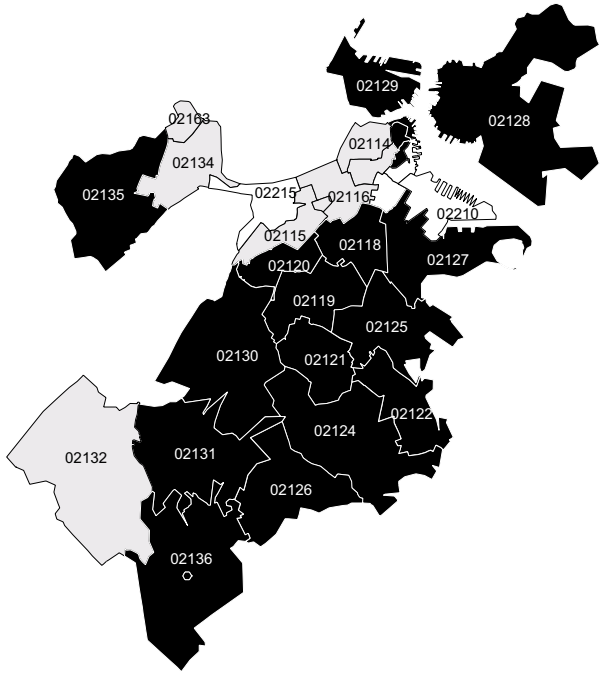


Age Adjusted PH Rates per 1,000 Population

- 0.00 — 16.91
- 16.92 — 22.62
- 22.63 or greater

Figure 22

Preventable Hospitalizations in Boston FY98 and FY99, Ages 0-17

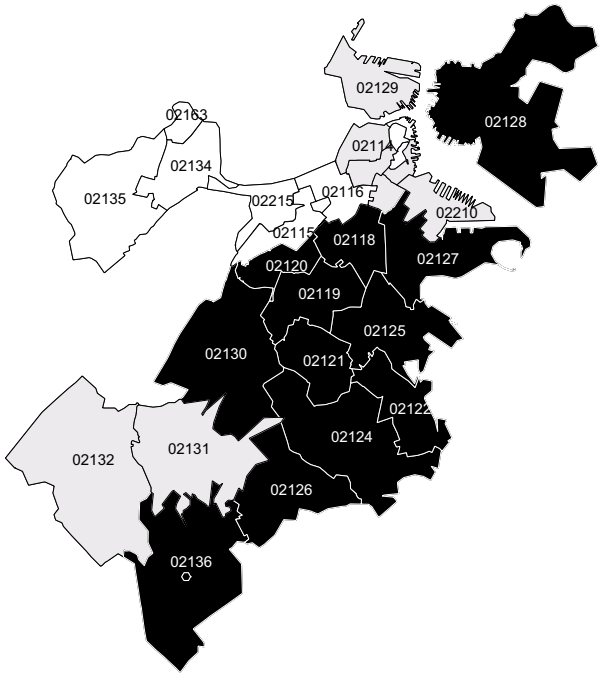


PH Rates per 1,000 Population

- 0.00 — 5.85
- 5.86 — 8.82
- 8.83 or greater

Figure 23

Preventable Hospitalizations in Boston FY98 and FY99, Ages 18-64

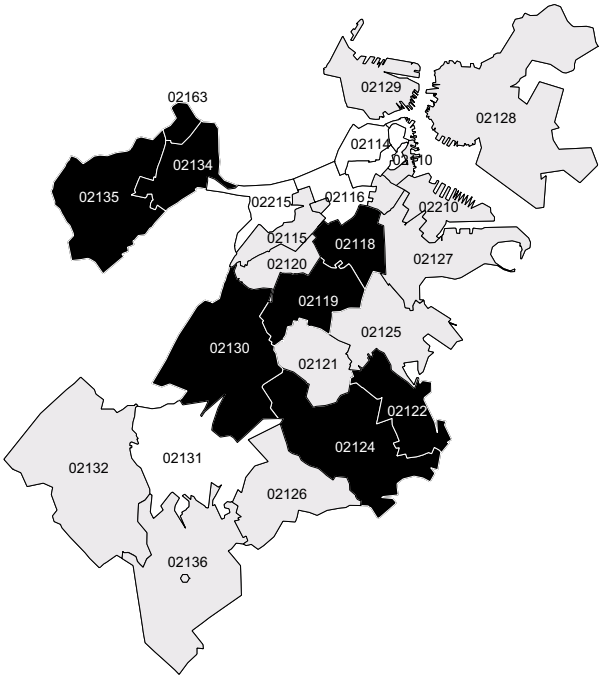


PH Rates per 1,000 Population

- 0.00 — 7.84
- 7.85 — 12.02
- 12.03 or greater

Figure 24

Preventable Hospitalizations in Boston FY98 and FY99, Ages 65 and Over

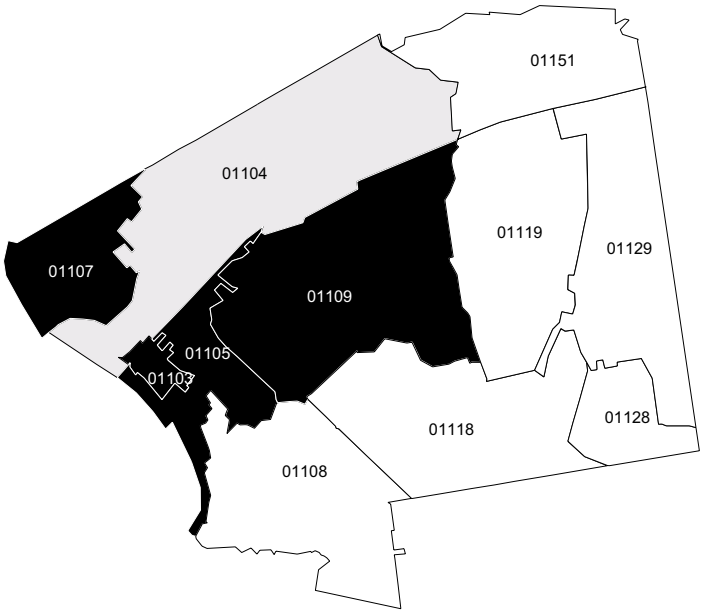


PH Rates per 1,000 Population

- 0.00 — 73.68
- 73.69 — 94.64
- 94.65 or greater

Figure 25

Preventable Hospitalizations in Springfield FY98 and FY99, All Ages



Age Adjusted PH Rates per 1,000 Population

- 0.00 — 16.91
- 16.92 — 22.62
- 22.63 or greater

Figure 26

Preventable Hospitalizations in Springfield FY98 and FY99, Ages 0-17

PH Rates per 1,000 Population

- 0.00 — 5.85
- 5.86 — 8.82
- 8.83 or greater

Figure 27

Preventable Hospitalizations in Springfield FY98 and FY99, Ages 18-64

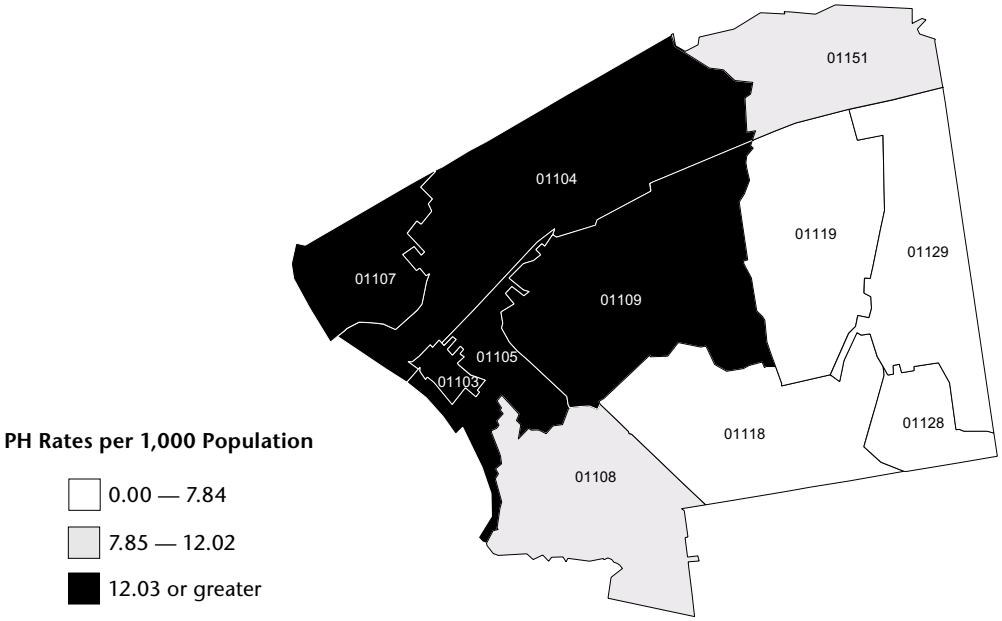


Figure 28

Preventable Hospitalizations in Springfield FY98 and FY99, Ages 65 and Over

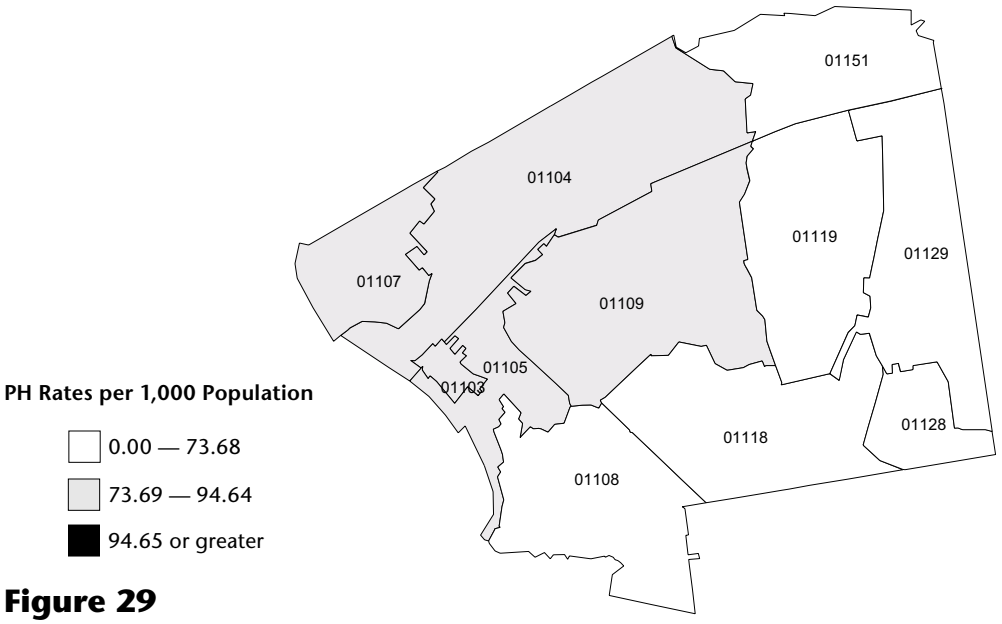
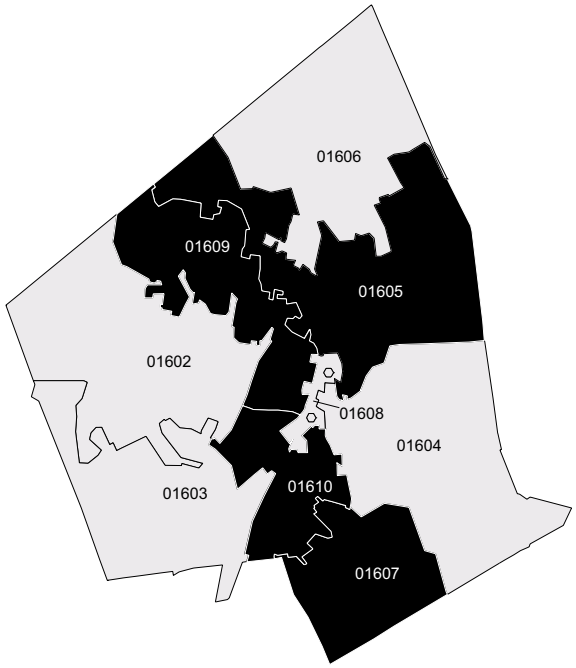


Figure 29

Preventable Hospitalizations in Worcester FY98 and FY99, Age Adjusted for All Ages

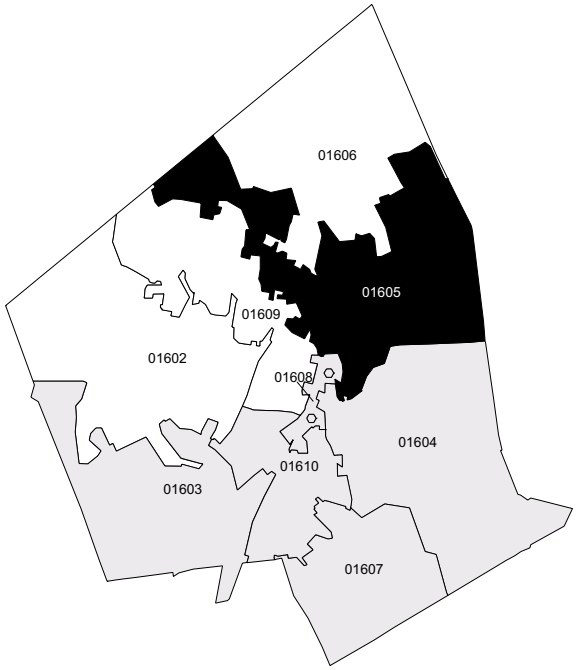


Age Adjusted PH Rates per 1,000 Population

- 0.00 — 16.91
- 16.92 — 22.62
- 22.63 or greater

Figure 30

Preventable Hospitalizations in Worcester FY98 and FY99, Ages 0-17

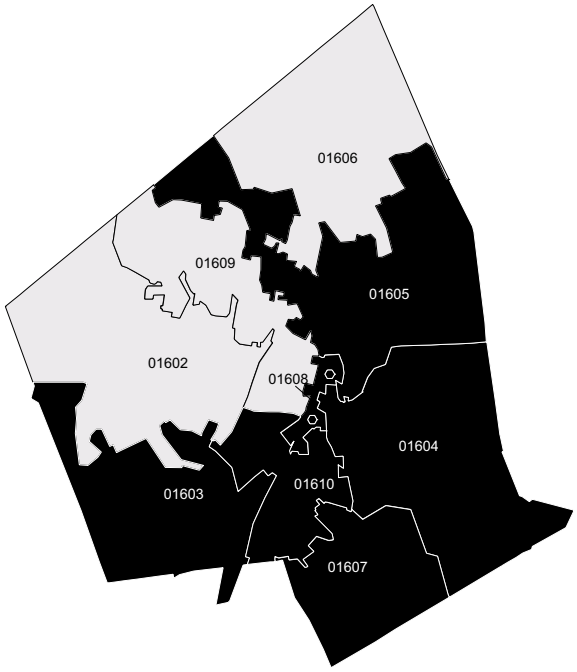


PH Rates per 1,000 Population

- 0.00 — 5.85
- 5.86 — 8.82
- 8.83 or greater

Figure 31

Preventable Hospitalizations in Worcester FY98 and FY99, Ages 18-64

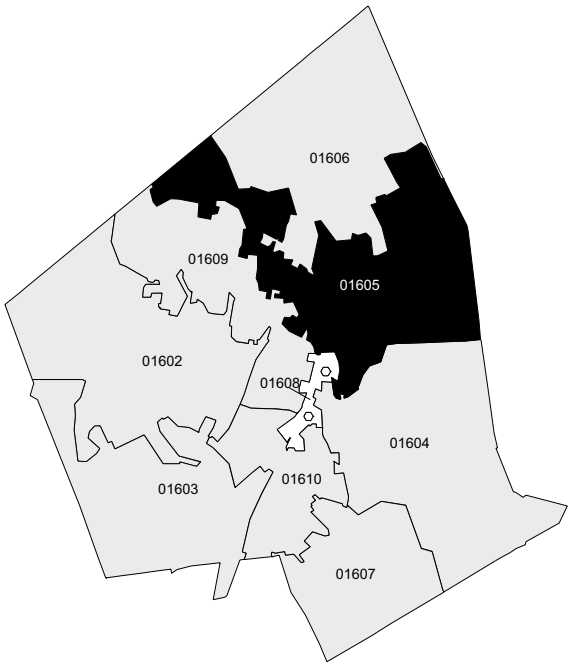


PH Rates per 1,000 Population

- 0.00 — 7.84
- 7.85 — 12.02
- 12.03 or greater

Figure 32

Preventable Hospitalizations in Worcester FY98 and FY99, Ages 65 and Over



PH Rates per 1,000 Population

- 0.00 — 73.68
- 73.69 — 94.64
- 94.65 or greater

Figure 33

depict variations in PH rates across Massachusetts and in greater detail for the three largest urban areas, Boston, Springfield and Worcester. Four maps of PH rates are presented for each area: all ages, ages 0-17, ages 18-64, and ages 65 and over. The PH rates for the "all ages" maps are the only maps for which the data is age adjusted.

As an indication of relative performance, each small area is expressed in terms of how far its PH rate is from the average across all small areas. The small areas are divided into three groups: 1) those with PHs less than the average of the small areas, 2) those with PH rates equal to the average and up to one standard deviation above the average, and 3) those small areas with PH rates equal to one standard deviation above the average or higher.

As in previous PH reports, the less affluent and urban areas remain those areas with the highest PH rates (see Figures 18-33). Pediatric PHs in Massachusetts are most concentrated in urban areas. PH rates increase in both urban and non-urban areas as age increases.

The Boston area maps show in greater detail, that PHs are higher in low-income neighborhoods (see Figures 22-25). Only a few small areas within Boston, in any age group, have PH rates at or below the average. The greatest disparity in PH rates among age groups and within a neighborhood occurs in Brighton. Brighton's PH rates for all ages, ages 0-17 and ages 65 and over are all over one standard deviation while those ages 18-64 are equal to or below the average for the state.

Springfield's PH rates are the lowest among the state's three largest urban areas (see Figures 26-29 on the preceding pages). Most of the eastern and southern areas of the city are at or below the state's PH average for each age group. This is in stark contrast to the northwestern part of the city, which was above average for each age group and, along with Central Springfield, above one standard deviation for those ages 18-64.

All of Worcester has higher than average preventable hospitalization rates for both the all ages group and those ages 18 to 64. Only one area within the city is equal to or below the average for those ages 65 and over (see Figures 30-33 on the preceding pages).

Endnotes for Highlights and Discussion

1. Angina's share of total preventable hospitalizations fell from 12% in Fiscal Years 1992 and 1993 to 3% in Fiscal Years 1998 and 1999. This decrease results primarily from a change in coding practice. In FY94 many hospitals began coding angina as a secondary diagnosis under a primary diagnosis of coronary artery disease (CAD). A closer study of the data showed that the drop in discharges with a primary diagnosis of angina after FY94 was offset by a rise in the number of discharges with a primary diagnosis of CAD. For a more complete description of how hospital's change in coding angina is adjusted, please see page 3, "Data Sources and Caveats".

2. Kozak, Lola Jean; Hall, Margaret J.; Owings, Maria F., National Center for Health Statistics (NCHS), Trends in Avoidable Hospitalizations, 1980 – 1998. *Health Affairs* – March/April 2001;

3. Elderly nursing home residents were identified using Medicaid's Management Minutes Questionnaire (MMQ) which is administered quarterly to all nursing home residents who are eligible for Medicaid. These nursing home residents were matched to the DHCFP's hospital discharge data set to determine how many were hospitalized for an ACS condition. In the previous PH report (FY95-FY96), elderly nursing home residents were identified using Medicaid claims records, rather than the MMQ. Those nursing home residents were compared to DHCFP's hospital discharge data set to determine how many were hospitalized for an ACS condition. Because of the different methodologies, we do not recommend comparing nursing home PH admission rates from these two periods.

4. Reynolds, M. Creating a Sustainable Long-Term Care System for Low-Income Seniors in Massachusetts. Massachusetts Division of Medical Assistance, May 2000, pg. 15

5. Based on telephone conversations with various Massachusetts hospitals and the Massachusetts Hospital Association.

6. Readmission defined as admission to hospital within 12 months of previous admission.

7. Billings, J. Consideration of the use of small area analysis as a tool to evaluate barriers to access. Health Resources and Services Administration. Consensus Conference on Small Area Analysts, DHHD Pub. No. HRS-A-PE 91-1[A]. Washington: DHHS 1990.

Appendix: Tables

Table I: Preventable Hospitalization (PH) Admissions and Observation Stays (Obs) by Diagnosis for All Ages

Type of Condition	PH Discharges							
	1992	1993	1994	1995	1996	1997	1998	1999
Asthma	13,449	13,836	12,561	10,520	9,030	9,139	8,296	8,315
Bacterial Pneumonia	21,115	21,502	21,880	21,925	20,068	22,657	22,940	25,668
Cellulitis	8,265	8,287	7,712	7,312	6,496	6,404	6,877	6,729
Congestive Heart Failure	24,406	24,917	24,550	23,595	23,756	24,182	24,565	22,901
Dehydration	10,351	9,687	10,077	8,946	8,805	9,641	9,029	9,518
Kidney/Urinary Infection	9,131	9,452	9,128	8,941	8,479	8,227	8,597	8,727
COPD	10,142	12,197	12,060	12,668	12,182	13,400	13,919	14,847
Diabetes	6,160	5,398	5,572	4,961	4,830	4,865	4,749	4,974
Angina	16,787	16,650	13,236	7,510	5,261	3,982	3,117	2,527
Convulsions	3,163	3,899	4,151	3,726	3,482	3,421	3,507	3,767
All Other Conditions (14)	14,359	12,573	10,054	8,000	6,512	6,485	5,823	5,769
Total PHs	**137,328**	**138,398**	**130,981**	**118,104**	**108,901**	**112,403**	**111,419**	**113,742**
Total Discharges	**854,395**	**834,472**	**784,542**	**749,631**	**721,955**	**733,165**	**735,558**	**737,705**

Notes: COPD = Chronic Obstructive Pulmonary Disease, n/a = not applicable
Source: Massachusetts Division of Health Care Finance and Policy

1998 Obs	Ratio 1998 Obs /1998 PHs	1999 Obs	Ratio 1999 Obs /1999 PHs	PHs as Share of Total PHs 92+93	95+96	98+99	PHs per 1,000 Population 92+93	95+96	98+99
3,611	43.5%	3,985	47.9%	10%	9%	7%	2.26	1.62	1.35
1,439	6.3%	2,002	7.8%	15%	18%	22%	3.53	3.47	3.95
897	13.0%	1,036	15.4%	6%	6%	6%	1.37	1.14	1.11
1,501	6.1%	1,611	7.0%	18%	21%	21%	4.09	3.92	3.86
3,392	37.6%	4,120	43.3%	7%	8%	8%	1.66	1.47	1.51
1,133	13.2%	1,157	13.3%	7%	8%	8%	1.54	1.44	1.41
1,159	8.3%	1,418	9.6%	8%	11%	13%	1.85	2.05	2.34
852	17.9%	933	18.8%	4%	4%	4%	0.96	0.81	0.79
1,261	40.5%	1,182	46.8%	12%	6%	3%	2.77	1.06	0.46
1,261	36.0%	1,459	38.7%	3%	3%	3%	0.58	0.60	0.59
3,142	54.0%	3,284	56.9%	10%	6%	5%	2.23	1.20	0.94
19,648	**17.6%**	**22,187**	**19.5%**	**100%**	**100%**	**100%**	**22.84**	**18.77**	**18.31**
135,653	**18.4%**	**145,988**	**19.8%**	**n/a**	**n/a**	**n/a**	**139.91**	**121.69**	**119.81**

Table 2: Preventable Hospitalization (PH) Admissions and Observation Stays (Obs) by Diagnosis for Ages 0-64

Type of Condition	PH Discharges							
	1992	1993	1994	1995	1996	1997	1998	1999
Asthma	10,731	11,092	10,286	8,503	7,368	7,457	6,750	6,696
Bacterial Pneumonia	7,807	7,903	8,663	7,795	6,900	7,355	7,045	8,142
Cellulitis	4,881	4,957	4,688	4,345	3,720	3,674	3,980	3,856
Congestive Heart Failure	3,933	4,089	3,927	3,441	3,595	3,490	3,670	3,489
Dehydration	4,848	3,978	4,336	3,819	3,515	3,955	3,515	3,699
Kidney/Urinary Infection	3,727	3,893	3,918	3,674	3,305	3,166	3,132	3,067
COPD	2,903	3,329	3,447	3,572	3,456	3,823	3,767	4,017
Diabetes	3,918	3,433	3,407	3,115	2,920	3,000	2,974	3,051
Angina	6,001	5,974	4,834	2,906	1,983	1,466	1,157	987
Convulsions	2,265	2,677	2,900	2,505	2,175	2,164	2,227	2,465
All Other Conditions (14)	10,722	9,325	7,587	5,948	4,691	4,637	4,119	4,061
Total PHs	**61,736**	**60,650**	**57,993**	**49,623**	**43,628**	**44,187**	**42,336**	**43,530**
Total Discharges	**562,118**	**540,170**	**503,841**	**470,924**	**445,063**	**445,301**	**444,404**	**445,493**

Notes: COPD = Chronic Obstructive Pulmonary Disease, n/a = not applicable
Source: Massachusetts Division of Health Care Finance and Policy

Table 3: Preventable Hospitalization (PH) Admissions and Observation Stays (Obs) by Diagnosis for Ages 0-17

Type of Condition	PH Discharges							
	1992	1993	1994	1995	1996	1997	1998	1999
Asthma	4,825	4,818	4,372	3,242	2,793	2,881	2,313	2,388
Bacterial Pneumonia	2,202	2,191	2,303	2,034	1,612	1,663	1,480	1,812
Dehydration	2,525	1,658	2,105	1,830	1,648	1,965	1,598	1,777
Kidney/Urinary Infection	889	1,014	1,055	1,026	989	897	885	862
Convulsions	895	996	986	786	676	636	671	763
All Other Conditions (19)	4,988	4,436	3,702	2,893	2,294	2,414	2,274	2,256
Total PHs	**16,324**	**15,113**	**14,523**	**11,811**	**10,012**	**10,456**	**9,221**	**9,858**
Total Discharges	**150,729**	**143,145**	**134,948**	**134,949**	**128,018**	**120,944**	**120,408**	**119,206**

Note: n/a = not applicable
Source: Massachusetts Division of Health Care Finance and Policy

1998 Obs	Ratio 1998 Obs /1998 PHs	1999 Obs	Ratio 1999 Obs /1999 PHs	PHs as Share of Total PHs 92+93	95+96	98+99	PHs per 1,000 Population 92+93	95+96	98+99
3,379	50.1%	3,740	55.9%	18%	17%	16%	2.09	1.53	1.28
1,001	14.2%	1,428	17.5%	13%	16%	18%	1.51	1.42	1.44
717	18.0%	808	21.0%	8%	9%	9%	0.94	0.78	0.74
294	8.0%	349	10.0%	7%	8%	8%	0.77	0.68	0.68
2,569	73.1%	3,270	88.4%	7%	8%	8%	0.85	0.71	0.68
700	22.3%	721	23.5%	6%	7%	7%	0.73	0.67	0.59
409	10.9%	487	12.1%	5%	8%	9%	0.60	0.68	0.74
553	18.6%	596	19.5%	6%	6%	7%	0.71	0.58	0.57
550	47.5%	564	57.1%	10%	5%	3%	1.15	0.47	0.20
1,073	48.2%	1,258	51.0%	4%	5%	5%	0.47	0.45	0.45
2,558	62.1%	2,731	67.2%	16%	11%	10%	1.92	1.02	0.78
13,803	**32.6%**	**15,952**	**36.6%**	**100%**	**100%**	**100%**	**11.74**	**8.98**	**8.15**
100,649	**22.6%**	**109,017**	**24.5%**	**n/a**	**n/a**	**n/a**	**85.41**	**88.22**	**84.48**

1998 Obs	Ratio 1998 Obs /1998 PHs	1999 Obs	Ratio 1999 Obs /1999 PHs	PHs as Share of Total PHs 92+93	95+96	98+99	PHs per 1,000 Population 92+93	95+96	98+99
1,629	70.4%	1,865	78.1%	31%	28%	25%	3.50	2.18	1.66
552	37.3%	784	43.3%	14%	17%	17%	1.59	1.32	1.16
1,694	106.0%	2,237	125.9%	13%	16%	18%	1.52	1.26	1.19
146	16.5%	179	20.8%	6%	9%	9%	0.69	0.73	0.62
363	54.1%	407	53.3%	6%	7%	8%	0.69	0.53	0.51
1,303	57.3%	1,515	67.2%	30%	24%	24%	3.42	1.88	1.60
5,687	**61.7%**	**6,987**	**70.9%**	**100%**	**100%**	**100%**	**11.40**	**7.89**	**6.75**
18,887	**15.7%**	**21,349**	**17.9%**	**n/a**	**n/a**	**n/a**	**106.54**	**95.09**	**84.73**

Table 4: Preventable Hospitalization (PH) Admissions and Observation Stays (Obs) by Diagnosis for Ages 18-64

Type of Condition	PH Discharges							
	1992	1993	1994	1995	1996	1997	1998	1999
Asthma	5,906	6,274	5,914	5,245	4,575	4,576	4,437	4,308
Bacterial Pneumonia	5,605	5,712	6,360	5,743	5,286	5,692	5,565	6,330
Cellulitis	4,148	3,782	3,880	3,627	3,106	3,054	3,329	3,234
Congestive Heart Failure	3,872	4,034	3,871	3,384	3,537	3,442	3,626	3,455
Dehydration	2,323	2,320	2,231	1,986	1,867	1,990	1,917	1,922
Kidney/Urinary Infection	2,838	2,879	2,863	2,641	2,315	2,269	2,247	2,205
COPD	2,831	3,286	3,401	3,526	3,420	3,790	3,740	3,995
Diabetes	3,368	2,960	2,871	2,665	2,552	2,619	2,563	2,623
Angina	6,000	5,970	4,833	2,901	1,983	1,465	1,157	986
Convulsions	1,370	1,681	1,914	1,710	1,499	1,528	1,556	1,702
All Other Conditions (14)	7,151	6,639	5,332	4,298	3,469	3,306	2,978	2,912
Total PHs	**45,412**	**45,537**	**43,470**	**37,726**	**33,609**	**33,731**	**33,115**	**33,672**
Total Discharges	**411,389**	**397,025**	**368,890**	**342,906**	**324,119**	**324,893**	**323,996**	**326,287**

Notes: COPD = Chronic Obstructive Pulmonary Disease, n/a = not applicable
Source: Massachusetts Division of Health Care Finance and Policy

1998 Obs	Ratio 1998 Obs /1998 PHs	1999 Obs	Ratio 1999 Obs /1999 PHs	PHs as Share of Total PHs 92+93	95+96	98+99	PHs per 1,000 Population 92+93	95+96	98+99
1,750	39.4%	1,875	43.5%	13%	14%	13%	1.59	1.29	1.13
449	8.1%	644	10.2%	12%	15%	18%	1.48	1.45	1.54
548	16.5%	627	19.4%	9%	9%	10%	1.03	0.88	0.85
289	8.0%	344	10.0%	9%	10%	11%	1.03	0.91	0.92
875	45.6%	1,033	53.7%	6%	5%	6%	0.61	0.51	0.50
554	24.7%	542	24.6%	6%	7%	7%	0.75	0.65	0.58
402	10.7%	479	12.0%	7%	10%	12%	0.80	0.91	1.00
488	19.0%	528	20.1%	7%	7%	8%	0.83	0.68	0.67
549	47.5%	564	57.2%	13%	7%	3%	1.56	0.64	0.28
710	45.6%	851	50.0%	3%	4%	5%	0.40	0.42	0.42
2,202	73.9%	1,478	50.8%	15%	11%	9%	1.80	1.02	0.76
8,816	**26.6%**	**8,965**	**26.6%**	**100%**	**100%**	**100%**	**11.86**	**9.37**	**8.67**
81,762	**25.2%**	**87,668**	**26.9%**	**n/a**	**n/a**	**n/a**	**105.45**	**87.58**	**84.38**

Table 5: Preventable Hospitalization (PH) Admissions and Observation Stays (Obs) by Diagnosis for Ages 65 and Older

Type of Condition	PH Discharges							
	1992	1993	1994	1995	1996	1997	1998	1999
Congestive Heart Failure	20,473	20,828	20,623	20,154	20,161	20,692	20,895	19,412
Bacterial Pneumonia	13,308	13,599	13,217	14,130	13,168	15,302	15,895	17,526
COPD	7,239	8,868	8,613	9,096	8,726	9,577	10,152	10,830
Kidney/Urinary Infection	5,404	5,559	5,210	5,267	5,174	5,061	5,465	5,660
Dehydration	5,503	5,709	5,741	5,127	5,290	5,686	5,514	5,819
Angina	10,786	10,676	8,402	4,604	3,278	2,516	1,960	1,540
Cellulitis	3,384	3,330	3,024	2,967	2,776	2,730	2,897	2,873
Asthma	2,718	2,744	2,275	2,017	1,662	1,682	1,546	1,619
Diabetes	2,242	1,965	2,165	1,846	1,910	1,865	1,775	1,923
Convulsions	898	1,222	1,251	1,221	1,307	1,257	1,280	1,302
All Other Conditions (14)	3,637	3,248	2,467	2,052	1,821	1,848	1,704	1,708
Total PHs	**75,592**	**77,748**	**72,988**	**68,481**	**65,273**	**68,216**	**69,083**	**70,212**
Total Discharges	**292,277**	**294,302**	**280,701**	**278,707**	**276,892**	**287,864**	**291,154**	**292,212**

Notes: COPD = Chronic Obstructive Pulmonary Disease, n/a = not applicable
Source: Massachusetts Division of Health Care Finance and Policy

Table 6: Preventable Hospitalization (PH) Admissions for Nursing Facility and Community Residents Ages 65 and Older

		Number of Discharges 1998	1999
Nursing Facility Residents	Total Hospitalizations	17,851	19,929
	Preventable Hospitalizations	5,403	6,058
	PHs as Share of Total	30.3%	30.4%
Community Residents	Total Hospitalizations	283,797	281,390
	Preventable Hospitalizations	69,083	70,212
	PHs as Share of Total	24.3%	25.0%

Notes: Preventable hospitalizations among nursing facility residents identified using Medicaid's Managed Minute Questionnaire.
These nursing home residents are matched to DHCFP's Medicare hospital discharge data set to determine actual hospitalization.
Source: Massachusetts Division of Health Care Finance and Policy

1998 Obs	Ratio 1998 Obs /1998 PHs	1999 Obs	Ratio 1999 Obs /1999 PHs	PHs as Share of Total PHs 92+93	95+96	98+99	PHs per 1,000 Population 92+93	95+96	98+99
1,207	5.8%	1,262	6.5%	27%	30%	29%	25.09	23.57	22.87
438	2.8%	574	3.3%	18%	20%	24%	16.34	15.97	18.96
750	7.4%	931	8.6%	10%	13%	15%	9.78	10.42	11.91
433	7.9%	436	7.7%	7%	8%	8%	6.66	6.10	6.31
823	14.9%	850	14.6%	7%	8%	8%	6.81	6.09	6.43
711	36.3%	618	40.1%	14%	6%	3%	13.04	4.62	1.99
180	6.2%	228	7.9%	4%	4%	4%	4.08	3.36	3.27
232	15.0%	245	15.1%	4%	3%	2%	3.32	2.15	1.80
299	16.8%	337	17.5%	3%	3%	3%	2.56	2.20	2.10
188	14.7%	201	15.4%	1%	2%	2%	1.29	1.48	1.47
584	34.3%	553	32.4%	4%	3%	2%	4.18	2.27	1.94
5,845	**8.5%**	**6,235**	**8.9%**	**100%**	**100%**	**100%**	**93.14**	**78.22**	**79.04**
35,004	**12.0%**	**36,971**	**12.7%**	**n/a**	**n/a**	**n/a**	**356.30**	**324.80**	**331.03**

Table 7: Preventable Hospitalization (PH) Admissions and Observation Stays (Obs) by Payer for All Ages

Type of Payer	PH Discharges				
	1995	1996	1997	1998	1999
Commercial Managed Care	724	639	551	535	629
Commercial Non-Managed Care	10,104	8,371	8,012	6,546	6,114
HMO	14,918	14,758	16,113	16,577	17,050
PPO and Other Managed Care Plans	1,427	1,436	1,486	1,837	2,129
Point of Service Plan	98	135	153	472	493
Medicare Managed Care	1,754	2,671	4,865	8,233	10,804
Medicare Non-Managed Care	66,962	61,981	62,466	60,307	59,351
Medicaid Managed Care	1,945	1,952	2,621	2,966	3,110
Medicaid Non-Managed Care	9,096	7,461	6,745	6,286	7,192
Uninsured	6,124	5,242	4,920	3,774	3,075
Other	4,674	4,222	4,471	3,886	3,795
Total PHs	**117,826**	**108,868**	**112,403**	**111,419**	**113,742**
Total Discharges	**749,633**	**721,958**	**733,167**	**735,593**	**737,747**

Notes: HMO enrollees whose primary payer is Medicaid, Medicare or Blue Cross Blue Shield are classified under the latter categories.
Figures for the HMO payer group include only non-Medicaid, non-Medicare enrollees.
The uninsured category consists of free care and self-pay discharges.
Medicare eligibility for population under 65 is based on disability criteria.
Percentages may not add up to 100 due to rounding.
n/a = not applicable
Source: Massachusetts Division of Health Care Finance and Policy

1998 Obs	Ratio 1998 Obs /1998 PHs	1999 Obs	Ratio 1999 Obs /1999 PHs	PHs as a Share of Total PHs 1995+96	PHs as a Share of Total PHs 1998+99	PHs as a Share of Total Payer Discharges 1995+96	PHs as a Share of Total Payer Discharges 1998+99
149	28%	227	36.1%	0.6%	0.5%	16.0%	6.5%
1,839	28%	2,311	37.8%	8.1%	5.6%	10.2%	10.0%
5,981	36%	6,681	39.2%	13.1%	14.9%	8.8%	8.3%
754	41%	890	41.8%	1.3%	1.8%	8.3%	7.2%
207	44%	207	42.0%	0.1%	0.4%	4.5%	7.9%
1,419	17%	2,229	20.6%	2.0%	8.4%	26.5%	21.2%
4,311	7%	4,037	6.8%	56.9%	53.2%	23.0%	23.2%
949	32%	995	32.0%	1.7%	2.7%	14.1%	11.8%
2,598	41%	3,393	47.2%	7.3%	6.0%	11.5%	11.3%
1,109	29%	993	32.3%	5.0%	3.0%	13.4%	11.9%
332	9%	224	5.9%	3.9%	3.4%	12.3%	31.7%
19,648	**18%**	**22,187**	**19.5%**	**100%**	**100%**		
100,649	**14%**	**109,017**	**14.8%**				

Table 8: Preventable Hospitalization (PH) Rates by ZIP Code

Some PH ZIP Codes include postal ZIP Codes for communities that have been grouped.

PH ZIP Code	USPS ZIP Code	PH Rate	City/Town/Area
01001	01001	**14.5**	**Agawam**
01002	01002	**11.6**	**Amherst**
01003	01003	**3.2**	**Amherst/N. Amherst**
	01004		
	01059		
01005	01005	**14.9**	**Barre/S. Barre**
	01074		
01007	01007	**15.9**	**Belchertown**
01010	01010	**20.4**	**Brimfield/Holland/Wales**
	01081		
	01521		
01013	01013	**15.2**	**Chicopee**
	01014		
01020	01020	**16.3**	**Chicopee**
	01022		
01027	01027	**17.0**	**Easthampton**
01028	01028	**10.1**	**East Longmeadow**
01030	01030	**11.0**	**Feeding Hills**
01033	01033	**13.0**	**Granby**
01035	01035	**14.7**	**Hadley**
01036	01036	**8.1**	**Hampden**
01038	01038	**15.2**	**Hatfield/Williamsburg/Haydenville/N. Hatfield/W. Hatfield**
	01039		
	01066		
	01088		
	01096		
01040	01040	**27.4**	**Holyoke**
01050	01012	**11.5**	**Huntington/Worthington/Cummington/Chesterfield/Plainfield/Goshen/Middlefield/W. Chesterfield**
	01026		
	01032		
	01050		
	01070		

Table 8: Preventable Hospitalization (PH) Rates by ZIP Code *(continued)*

Some PH ZIP Codes include postal ZIP Codes for communities that have been grouped.

PH ZIP Code	USPS ZIP Code	PH Rate	City/Town/Area
	01084		
	01098		
	01243		
01056	01056	**10.8**	**Ludlow**
01057	01057	**15.9**	**Monson**
01060	01060	**27.8**	**Northampton**
	01063		
01062	01053	**15.6**	**Florence/Leeds**
	01062		
01068	01031	**17.0**	**Oakham/Gilbertville/N. Braintree/Hardwick/Wheelwright**
	01037		
	01068		
	01094		
	01531		
01069	01009	**18.2**	**Palmer/Three Rivers/Bondsville/Thorndike**
	01069		
	01079		
	01080		
01071	01008	**10.0**	**Russell/Chester/Granville/Blandford**
	01011		
	01034		
	01071		
01073	01073	**19.7**	**Southampton**
01075	01075	**16.7**	**South Hadley**
01077	01077	**12.7**	**Southwick**
01082	01082	**17.1**	**Ware**
01085	01085	**16.3**	**Westfield/Woronoco**
	01097		
01089	01089	**15.2**	**West Springfield**
01095	01095	**10.1**	**Wilbraham**
01104	01104	**22.3**	**Springfield**
01105	01103	**25.5**	**Springfield**

Table 8: Preventable Hospitalization (PH) Rates by ZIP Code *(continued)*

Some PH ZIP Codes include postal ZIP Codes for communities that have been grouped.

PH ZIP Code	USPS ZIP Code	PH Rate	City/Town/Area
01105	01105		
01106	01106	**8.9**	**Longmeadow**
	01116		
01107	01107	**28.6**	**Springfield**
01108	01108	**15.9**	**Springfield**
01109	01109	**24.8**	**Springfield**
01118	01118	**9.9**	**Springfield**
01119	01119	**14.4**	**Springfield**
01129	01128	**12.7**	**Springfield**
	01129		
01151	01151	**16.6**	**Indian Orchard**
01201	01201	**20.5**	**Pittsfield**
01220	01220	**20.4**	**Adams/Lanesboro**
	01237		
01225	01223	**17.7**	**Cheshire/Hinsdale/Becket/Windsor/Savoy**
	01225		
	01235		
	01256		
	01270		
01226	01226	**14.6**	**Dalton**
	01227		
01230	01230	**12.8**	**Great Barrington/N. Egremont/Mill River**
	01244		
	01252	**12.8**	
01236	01229	**8.0**	**Housatonic/Stockbridge/W. Stockbridge/Glendale**
	01236		
	01262		
	01266		
01238	01238	**17.3**	**Lee/Lenox Dale/S. Lee/Tyringham**
	01242		
	01260		
	01264		

Table 8: Preventable Hospitalization (PH) Rates by ZIP Code *(continued)*

Some PH ZIP Codes include postal ZIP Codes for communities that have been grouped.

PH ZIP Code	USPS ZIP Code	PH Rate	City/Town/Area
01240	01240	**15.4**	**Lenox/Richmond**
	01254		
01247	01247	**27.2**	**North Adams/Drury**
	01343		
01257	01029	**12.8**	**Sheffield/Ashley Falls/Otis/Monterey/Southfield/S. Egremont/Sandisfield/E. Otis**
	01222		
	01245		
	01253		
	01255		
	01257		
	01258		
	01259		
01267	01267	**17.4**	**Williamstown**
01301	01301	**17.7**	**Greenfield**
	01302		
01331	01331	**23.3**	**Athol/Petersham/Royalston**
	01366		
	01368		
01337	01337	**10.0**	**Bernardston/Northfield**
	01360		
01341	01330	**12.0**	**Conway/Charlemont/Ashfield/Rowe/Heath/Monroe Bridge**
	01339		
	01341		
	01346		
	01350		
	01367		
01351	01344	**10.9**	**Montague/Erving/Wendell/Turners Falls/Warwick/Wendell Depot/Lake Pleasant**
	01347		
	01349		
	01351		
	01378		
	01379		

Table 8: Preventable Hospitalization (PH) Rates by ZIP Code *(continued)*

Some PH ZIP Codes include postal ZIP Codes for communities that have been grouped.

PH ZIP Code	USPS ZIP Code	PH Rate	City/Town/Area
01351	01380		
01364	01364	**24.8**	**Orange**
01370	01338	**12.2**	**Shelburne Falls/Colrain/Buckland**
	01340		
	01370		
01373	01093	**11.2**	**S. Deerfield/Deerfield/Whately**
	01342		
	01373	**11.2**	
01375	01054	**11.0**	**Sunderland/Leverett/Shutesbury/New Salem**
	01072		
	01355		
	01375		
01376	01376	**21.0**	**Turners Falls**
01420	01420	**18.4**	**Fitchburg**
01432	01432	**26.7**	**Ayer**
01440	01440	**21.1**	**Gardner**
01450	01450	**12.2**	**Groton/West Groton/Dunstable**
	01472		
	01827		
01451	01451	**8.2**	**Harvard/Bolton/Still River**
	01467		
	01740		
01453	01453	**15.3**	**Leominster**
01460	01460	**12.8**	**Littleton**
01462	01462	**10.0**	**Lunenburg**
01463	01463	**12.7**	**Pepperell**
01464	01464	**13.2**	**Shirley**
01468	01436	**18.0**	**Templeton/Baldwinville/E. Templeton**
	01438		
	01468		
01469	01431	**12.2**	**Townsend/Ashby/W. Townsend**
	01469		

Table 8: Preventable Hospitalization (PH) Rates by ZIP Code *(continued)*

Some PH ZIP Codes include postal ZIP Codes for communities that have been grouped.

PH ZIP Code	USPS ZIP Code	PH Rate	City/Town/Area
01469	01474		
01473	01430	**13.1**	**Westminster/Ashburnham**
	01473		
01475	01475	**18.2**	**Winchendon/Winchendon Springs**
	01477		
01501	01501	**16.7**	**Auburn**
01504	01504	**18.3**	**Blackstone**
01506	01083	**15.0**	**Brookfield/Warren/W. Warren**
	01092		
	01506		
01507	01507	**18.5**	**Charlton/Charlton City/Charlton Depot**
	01508		
	01509		
01510	01510	**27.2**	**Clinton**
01516	01516	**14.3**	**Douglas**
01519	01519	**11.8**	**Grafton/S. Grafton**
	01560		
01520	01520	**9.7**	**Holden/Jefferson**
	01522		
01523	01523	**14.3**	**Lancaster/S. Lancaster**
	01561		
01524	01524	**17.3**	**Leicester/Cherry Valley/Rochdale**
	01542		
	01611		
01527	01527	**17.6**	**Milbury/W. Milbury**
	01586		
01532	01532	**12.4**	**Northborough**
01535	01515	**17.6**	**N. Brookfield/W. Brookfield/E. Brookfield**
	01535		
	01585		
01536	01536	**13.5**	**North Grafton**
01540	01537	**22.7**	**Oxford/N. Oxford**

Table 8: Preventable Hospitalization (PH) Rates by ZIP Code *(continued)*

Some PH ZIP Codes include postal ZIP Codes for communities that have been grouped.

PH ZIP Code	USPS ZIP Code	PH Rate	City/Town/Area
01540	01540		
01541	01452	**10.2**	**Princeton/Hubbardston**
	01541		
01543	01543	**12.8**	**Rutland/Paxton**
	01612		
01545	01545	**13.3**	**Shrewsbury**
01550	01550	**22.0**	**Southbridge**
01562	01562	**20.3**	**Spencer**
01564	01564	**11.0**	**Sterling**
01566	01518	**16.3**	**Sturbridge/Fiskdale**
	01566		**Sturbridge/Fiskdale**
01568	01568	**13.3**	**Upton**
01569	01538	**15.0**	**Uxbridge/N. Uxbridge**
	01569		**Uxbridge/N. Uxbridge**
01570	01570	**29.1**	**Webster**
01571	01571	**15.2**	**Dudley**
01581	01581	**17.2**	**Westborough**
01583	01503	**12.6**	**West Boylston/Boylston/Berlin**
	01505		**West Boylston/Boylston/Berlin**
	01583		**West Boylston/Boylston/Berlin**
01588	01525	**16.8**	**Whitinsville/Northbridge/Linwood**
	01534		**Whitinsville/Northbridge/Linwood**
	01588		**Whitinsville/Northbridge/Linwood**
01590	01526	**14.2**	**Sutton/Manchaug**
	01590		**Sutton/Manchaug**
01602	01602	**17.4**	**Worcester**
01603	01603	**20.5**	**Worcester**
01604	01604	**22.1**	**Worcester**
01605	01605	**32.7**	**Worcester**
01606	01606	**17.6**	**Worcester**
01607	01607	**23.7**	**Worcester**
01608	01601	**21.0**	**Worcester**

Table 8: Preventable Hospitalization (PH) Rates by ZIP Code *(continued)*

Some PH ZIP Codes include postal ZIP Codes for communities that have been grouped.

PH ZIP Code	USPS ZIP Code	PH Rate	City/Town/Area
	01608		
	01614		
01609	01609	**22.7**	**Worcester**
01610	01610	**29.1**	**Worcester**
01701	01701	**15.2**	**Framingham**
	01703		
	01704		
	01705		
01702	01702	**17.4**	**Framingham**
01720	01718	**10.4**	**Acton/Boxborough/Village of Nagog Wood**
	01719		
	01720		
01721	01721	**13.9**	**Ashland**
01730	01730	**12.7**	**Bedford**
	01731		
01742	01741	**11.2**	**Concord/Carlisle**
	01742		
01746	01746	**12.5**	**Holliston/Sherborn**
	01770		
01747	01747	**20.0**	**Hopedale**
01748	01748	**13.1**	**Hopkinton/Woodville**
	01784		
01749	01749	**16.0**	**Hudson**
01752	01752	**15.6**	**Marlborough**
01754	01754	**16.7**	**Maynard**
01756	01529	**14.7**	**Mendon/Millville**
	01756		
01757	01757	**19.2**	**Milford**
01760	01760	**21.5**	**Natick**
01772	01745	**9.6**	**Southborough/Fayville**
	01772		
01773	01773	**8.0**	**Lincoln**

Table 8: Preventable Hospitalization (PH) Rates by ZIP Code *(continued)*

Some PH ZIP Codes include postal ZIP Codes for communities that have been grouped.

PH ZIP Code	USPS ZIP Code	PH Rate	City/Town/Area
01775	01775	**11.5**	**Stow**
01776	01776	**11.6**	**Sudbury**
01778	01778	**12.0**	**Wayland**
01801	01801	**17.8**	**Woburn**
01803	01803	**13.4**	**Burlington**
01810	01810	**15.3**	**Andover**
01821	01821	**16.0**	**Billerica/Nutting Lake/Pinehurst**
	01822		
	01865		
	01866		
01824	01824	**15.1**	**Chelmsford**
01826	01826	**14.8**	**Dracut**
01830	01830	**34.9**	**Haverhill**
01832	01832	**20.0**	**Haverhill**
01833	01833	**14.6**	**Georgetown**
01834	01834	**13.9**	**Groveland**
01835	01835	**16.6**	**Haverhill**
01841	01840	**35.4**	**Lawrence**
	01841		
01843	01843	**22.0**	**Lawrence**
01844	01844	**20.0**	**Methuen**
01845	01845	**18.9**	**North Andover**
01850	01850	**22.5**	**Lowell**
01851	01851	**21.5**	**Lowell**
01852	01852	**26.7**	**Lowell**
01854	01854	**26.0**	**Lowell**
01860	01860	**14.5**	**Merrimac**
01862	01862	**18**	**North Billerica**
01863	01863	**15**	**North Chelmsford**
01864	01864	**13.4**	**North Reading**
01867	01867	**13.8**	**Reading**
01876	01876	**16.7**	**Tewksbury**

Table 8: Preventable Hospitalization (PH) Rates by ZIP Code *(continued)*

Some PH ZIP Codes include postal ZIP Codes for communities that have been grouped.

PH ZIP Code	USPS ZIP Code	PH Rate	City/Town/Area
01879	01879	**14.6**	**Tyngsboro**
01880	01880	**15.0**	**Wakefield**
01886	01886	**9.8**	**Westford**
01887	01887	**14.9**	**Wilmington**
01890	01890	**14.0**	**Winchester**
01902	01901	**27.4**	**Lynn**
	01902		
01904	01904	**18.7**	**Lynn**
01905	01905	**21.3**	**Lynn**
01906	01906	**17.2**	**Saugus**
01907	01907	**13.6**	**Swampscott**
	01908		
01913	01913	**20.5**	**Amesbury**
01915	01915	**18.2**	**Beverly/Prides Crossing**
	01965		
01921	01885	**8.5**	**Boxford/W. Boxford**
	01921		
01923	01923	**14.5**	**Danvers/Hathorne**
	01937		
01930	01930	**18.6**	**Gloucester**
01938	01929	**12.0**	**Ipswich/Essex**
	01938		
01940	01940	**10.8**	**Lynnfield**
01944	01944	**9.1**	**Manchester**
01945	01945	**10.2**	**Marblehead**
01949	01949	**11.8**	**Middleton**
01950	01950	**19.3**	**Newburyport**
01952	01952	**22.1**	**Salisbury**
01960	01960	**16.2**	**Peabody**
	01961		
01966	01966	**13.2**	**Rockport**
01969	01969	**12.6**	**Rowley**

Table 8: Preventable Hospitalization (PH) Rates by ZIP Code *(continued)*

Some PH ZIP Codes include postal ZIP Codes for communities that have been grouped.

PH ZIP Code	USPS ZIP Code	PH Rate	City / Town /Area
01970	01970	**17.6**	**Salem**
01982	01936	**10.1**	**South Hamilton/Hamilton/Wenham**
	01982		
	01984		
01983	01983	**7.9**	**Topsfield**
01985	01922	**12.4**	**W. Newbury/Newbury/Byfield**
	01951		
	01985		
02019	02019	**16.6**	**Bellingham**
02021	02021	**19.3**	**Canton**
02025	02025	**12.1**	**Cohasset**
02026	02026	**18.4**	**Dedham**
02030	02030	**10.0**	**Dover**
02035	02035	**16.4**	**Foxboro**
02038	02038	**18.0**	**Franklin**
02043	02018	**11.6**	**Hingham/Accord**
	02043		**Hingham/Accord**
02045	02045	**20.1**	**Hull**
02048	02048	**15.7**	**Mansfield**
02050	02020	**13.9**	**Marshfield/Ocean Bluff/Humarock/Marshfield Hills/Green Harbor/Brant Rock/N. Marshfield**
	02041		
	02047		
	02050		
	02051		
	02059		
	02065		
02052	02052	**12.2**	**Medfield**
02053	02053	**15.2**	**Medway**
02054	02054	**18.8**	**Millis**
02056	02056	**14.0**	**Norfolk**
02061	02061	**15.4**	**Norwell**
02062	02062	**22.2**	**Norwood**

Table 8: Preventable Hospitalization (PH) Rates by ZIP Code *(continued)*

Some PH ZIP Codes include postal ZIP Codes for communities that have been grouped.

PH ZIP Code	USPS ZIP Code	PH Rate	City/Town/Area
02066	02040	**12.8**	**Scituate/Minot/N. Scituate/Greenbush**
	02055		
	02060		
	02066		
02067	02067	**13.9**	**Sharon**
02072	02072	**19.1**	**Stoughton**
02081	02032	**17.9**	**Walpole/E. Walpole/S. Walpole**
	02071		
	02081		
02090	02090	**16.3**	**Westwood**
02093	02070	**18.2**	**Wrentham/Sheldonville**
	02093		
02111	02110	**19.0**	**Boston**
	02111		
	02210		
02113	02109	**13.8**	**Boston**
	02113		
02114	02108	**15.0**	**Boston**
	02114		
02115	02115	**18.8**	**Boston**
	02199		
02116	02116	**12.4**	**Boston**
02118	02118	**35.9**	**Boston**
02119	02119	**41.6**	**Boston**
02120	02120	**27.2**	**Boston**
02121	02121	**30.2**	**Boston**
02122	02122	**28.1**	**Boston**
02124	02124	**33.9**	**Boston**
02125	02125	**28.2**	**Boston**
02126	02126	**23.7**	**Mattapan**
02127	02127	**24.9**	**Boston**
02128	02128	**24.0**	**Boston**

Table 8: Preventable Hospitalization (PH) Rates by ZIP Code *(continued)*

Some PH ZIP Codes include postal ZIP Codes for communities that have been grouped.

PH ZIP Code	USPS ZIP Code	PH Rate	City/Town/Area
02129	02129	**20.0**	**Charlestown**
02130	02130	**27.0**	**Jamaica Plain**
02131	02131	**18.7**	**Roslindale**
02132	02132	**20.6**	**West Roxbury**
02134	02134	**24.3**	**Allston/Boston**
	02163		
02135	02135	**28.5**	**Brighton**
02136	02136	**21.8**	**Hyde Park/Readville**
	02137		
02138	02138	**15.0**	**Cambridge**
02139	02139	**21.5**	**Cambridge**
	02238		
02140	02140	**19.6**	**Cambridge**
02141	02141	**19.2**	**Cambridge**
	02142		
02143	02143	**22.7**	**Somerville**
02144	02144	**17.5**	**Somerville**
02145	02145	**24.9**	**Somerville**
02146	02146	**17.1**	**Brookline/Brookline Village**
	02447		
02148	02148	**21.5**	**Malden**
02149	02149	**25.7**	**Everett**
02150	02150	**28.5**	**Chelsea**
02151	02151	**23.7**	**Revere**
02152	02152	**17.6**	**Winthrop**
02154	02154	**21.8**	**Waltham**
02155	02153	**20.9**	**Medford/W. Medford**
	02155		
	02156		
02169	02169	**24.2**	**Quincy**
02170	02170	**14.3**	**Quincy**
02171	02171	**14.6**	**Quincy**

Table 8: Preventable Hospitalization (PH) Rates by ZIP Code *(continued)*

Some PH ZIP Codes include postal ZIP Codes for communities that have been grouped.

PH ZIP Code	USPS ZIP Code	PH Rate	City/Town/Area
02173	02173	**12.9**	**Lexington**
02174	02174	**16.8**	**Arlington/Arlington Heights**
	02475		
02176	02176	**19.7**	**Melrose**
02180	02180	**16.7**	**Stoneham**
02181	02181	**10.3**	**Wellesley/Babson Park**
	02457		
02184	02184	**17.1**	**Braintree**
02186	02186	**17.3**	**Milton/Milton Village**
	02187		
02188	02188	**20.4**	**Weymouth**
02189	02189	**18.1**	**Weymouth**
02190	02190	**16.7**	**Weymouth**
02191	02191	**16.6**	**Weymouth**
02215	02215	**10.7**	**Boston**
02301	02301	**30.8**	**Brockton**
02302	02302	**27.7**	**Brockton**
02322	02322	**17.3**	**Avon**
02324	02324	**14.7**	**Bridgewater**
	02325		
02330	02330	**15.6**	**Carver/S. Carver/N. Carver**
	02355		
	02366		
02332	02331	**14.8**	**Duxbury**
	02332		
02333	02333	**18.7**	**E. Bridgewater/Elmwood**
	02337		
02338	02338	**15.6**	**Halifax**
02339	02339	**12.6**	**Hanover**
02341	02341	**17.4**	**Hanson/Monponsett**
02341	02350		
02343	02343	**18.8**	**Holbrook**

Table 8: Preventable Hospitalization (PH) Rates by ZIP Code *(continued)*

Some PH ZIP Codes include postal ZIP Codes for communities that have been grouped.

PH ZIP Code	USPS ZIP Code	PH Rate	City/Town/Area
02346	02346	**18.7**	**Middleboro**
02347	02347	**12.5**	**Lakeville/Rochester**
	02770		
02351	02351	**18.9**	**Abington**
02356	02334	**16.4**	**North Easton/Easton**
	02356		
	02357		
02359	02327	**14.5**	**Pembroke/Bryantville/N. Pembroke**
	02358		
	02359		
02360	02345	**19.3**	**Plymouth/Manomet/White Horse Beach**
	02360		
	02361		
	02362		
	02381		
02364	02364	**18.6**	**Kingston/Plympton**
	02367		
02368	02368	**19.4**	**Randolph**
02370	02370	**17.7**	**Rockland**
02375	02375	**12.0**	**South Easton**
02379	02379	**19.1**	**West Bridgewater**
02382	02382	**17.2**	**Whitman**
02458	02458	**20.2**	**Newton**
	02495		
02459	02459	**12.2**	**Newton**
02460	02460	**13.3**	**Newton**
02461	02461	**13.2**	**Newton**
	02464		
02465	02465	**13.4**	**Newton**
02466	02462	**16.4**	**Auburndale/Newton**
	02466		
02467	02467	**9.4**	**Chestnut Hill**

Table 8: Preventable Hospitalization (PH) Rates by ZIP Code *(continued)*

Some PH ZIP Codes include postal ZIP Codes for communities that have been grouped.

PH ZIP Code	USPS ZIP Code	PH Rate	City/Town/Area
02468	02468	**10.0**	**Waban**
02472	02472	**18.4**	**Watertown**
02478	02478	**13.1**	**Belmont/Waverley**
	02479		
02492	02492	**17.1**	**Needham**
02493	02493	**14.9**	**Weston**
02494	02494	**16.8**	**Needham**
02532	02532	**18.5**	**Buzzards Bay/Sagamore Beach/Sagamore**
	02542		
	02561		
	02562		
02536	02536	**14.3**	**East Falmouth**
02537	02537	**10.3**	**East Sandwich**
02538	02538	**28.5**	**East Wareham/Onset**
	02558		
02539	02535	**13.0**	**Edgartown/W. Tisbury/Chilmark/Cuttyhunk/Menemsha**
	02539		
	02552		
	02575		
	02713		
02540	02540	**15.3**	**Falmouth/N. Falmouth/W. Falmouth/Woods Hole/Silver Beach**
	02541		
	02543		
	02556		
	02565		
	02574		
02554	02554	**17.9**	**Nantucket/Siasconset**
	02564		
	02584		
02559	02534	**14.8**	**Pocasset/Monument Beach/Cataumet**
	02553		
	02559		

Table 8: Preventable Hospitalization (PH) Rates by ZIP Code *(continued)*

Some PH ZIP Codes include postal ZIP Codes for communities that have been grouped.

PH ZIP Code	USPS ZIP Code	PH Rate	City/Town/Area
02563	02563	**10.0**	**Sandwich/Forestdale**
	02644		
02568	02557	**16.5**	**Vineyard Haven/Oak Bluffs**
	02568		
02571	02571	**26.5**	**Wareham/W. Wareham**
	02576		
02601	02601	**15.8**	**Hyannis/West Hyannisport/Hyannis Port**
	02647		
	02672		
02631	02631	**9.4**	**Brewster**
02632	02632	**9.2**	**Centerville**
02633	02633	**8.4**	**Chatham/W. Chatham/N. Chatham/S. Chatham**
	02650		
	02659		
	02669		
02638	02638	**11.4**	**Dennis/East Dennis**
	02641		
02642	02642	**8.9**	**Eastham/N. Eastham/Wellfleet/S. Wellfleet**
	02651		
	02663		
	02667		
02645	02645	**10.2**	**Harwich/Harwich Port/W. Harwich/S. Harwich**
	02646		
	02661		
	02671		
02648	02648	**10.5**	**Marstons Mills**
02649	02649	**16.1**	**Mashpee**
02653	02643	**7.9**	**Orleans/E. Orleans/S. Orleans**
	02653		
	02662		
02655	02635	**8.6**	**Osterville/Cotuit**
	02655		

Table 8: Preventable Hospitalization (PH) Rates by ZIP Code *(continued)*

Some PH ZIP Codes include postal ZIP Codes for communities that have been grouped.

PH ZIP Code	USPS ZIP Code	PH Rate	City/Town/Area
02657	02652	**11.1**	**Provincetown/Truro/N. Truro**
	02657		
	02666		
02660	02639	**13.7**	**S. Dennis/Dennis Port/W. Dennis**
	02660		
	02670		
02664	02664	**13.9**	**South Yarmouth**
02668	02630	**5.7**	**West Barnstable/Barnstable**
	02668		
02673	02673	**12.7**	**West Yarmouth**
02675	02637	**9.8**	**Yarmouth Port/Cummaquid**
	02675		
02703	02703	**16.7**	**Attleboro**
02717	02702	**12.2**	**East Freetown/Assonet**
	02717		
02718	02718	**12.5**	**East Taunton**
02719	02719	**16.5**	**Fairhaven**
02720	02720	**33.1**	**Fall River**
02721	02721	**32.3**	**Fall River**
02723	02723	**26.4**	**Fall River**
02724	02724	**28.0**	**Fall River**
02726	02725	**18.6**	**Somerset**
	02726		
02738	02738	**13.8**	**Marion**
02739	02739	**11.7**	**Mattapoisett**
02740	02740	**25.6**	**New Bedford**
02743	02743	**14.6**	**Acushnet**
02744	02744	**21.3**	**New Bedford**
02745	02745	**19.8**	**New Bedford**
02746	02746	**23.4**	**New Bedford**
02747	02714	**12.7**	**N. Dartmouth/Darmouth**
	02747		

Table 8: Preventable Hospitalization (PH) Rates by ZIP Code *(continued)*

Some PH ZIP Codes include postal ZIP Codes for communities that have been grouped.

PH ZIP Code	USPS ZIP Code	PH Rate	City/Town/Area
02748	02748	**14.5**	**South Dartmouth**
02760	02760	**13.8**	**North Attleboro/Attleboro Falls**
	02763		
02762	02762	**13.2**	**Plainville**
02764	02715	**13.9**	**North Dighton/Dighton**
	02764		
02766	02712	**14.9**	**Norton/Chartley**
	02766		
02767	02767	**16.5**	**Raynham/Raynham Center**
	02768		
02769	02769	**11.3**	**Rehoboth**
02771	02771	**12.8**	**Seekonk**
02777	02777	**17.6**	**Swansea**
02779	02779	**14.9**	**Berkley**
02780	02780	**22.6**	**Taunton**
02790	02790	**17.7**	**Westport/Westport Point**
	02791		
ALL		**16.9**	**MASSACHUSETTS**

Table 9: Ambulatory Care Sensitive (ACS) Conditions

Medical Conditions	ICD-9-CM Code
Angina	411.1, 411.8, 413
Asthma	493
Bacterial pneumonia	481, 482.2, 482.3, 482.9, 483, 485, 486
Cellulitis	681, 682, 683, 686
Chronic obstructive pulmonary disease	491, 492, 494, 496, 466.0
Congenital syphilis	090
Congestive heart failure	428, 402.01, 402.11, 402.91, 518.4
Convulsions	780.3
Dehydration	276.5
Diabetes	250.1, 250.2, 250.3, 250.8, 250.9, 250.0
Failure to thrive	783.4
Gastroenteritis	558.9
Grand mal status and epileptic convulsions	345
Hypertension	401.0, 401.9, 402.00, 402.10, 402.90
Hypoglycemia	251.2
Immunization related conditions	033, 037, 045, 320.0, 390, 391
Invasive cervical cancer	378
Iron deficiency anemia	280.1, 280.8, 280.9
Kidney/urinary infection	590, 599.0, 599.9
Nutritional deficiencies	260, 261, 262, 268.0, 268.1
Other tuberculosis	012, 013, 014, 015, 016, 017, 018
Pelvic inflammatory disease	614
Pulmonary tuberculosis	011
Severe ENT infections	382,462, 463, 465, 472.1

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